



2003 **INDEX OF LEADING ENVIRONMENTAL INDICATORS** **EIGHTH EDITION**

STEVEN HAYWARD
WITH RYAN STOWERS

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PACIFIC RESEARCH INSTITUTE

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INDEX OF LEADING ENVIRONMENTAL INDICATORS EIGHTH EDITION

BY

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WITH

RYAN STOWERS

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PACIFIC RESEARCH INSTITUTE FOR PUBLIC POLICY

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by Steven F. Hayward with Ryan Stowers

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PREFACE

This is the eighth edition of the *Index of Leading Environmental Indicators*, and the first to be published jointly by our two institutions—a bi-coastal collaboration.

When the Pacific Research Institute launched this report a decade ago, there were almost no efforts underway to assemble and present environmental trend data in a format that was both accessible and useful—attempting to show whether and where we were making environmental progress. Although the Environmental Protection Agency and other government agencies published reams of data, most were offshoots of regulatory programs and the EPA hadn't published a general report about environmental trends since 1989. The absence of composite measurements was remarkably negligent for a nation spending several hundred billion dollars a year on environmental quality.

In recent years the development of useable environmental indicators has become a growth industry. The EPA has embarked upon an environmental indicators project whose first draft is due to be released as this report goes to press, and the General Accounting Office is developing an environmental indicator framework of its own. The White House Council on Environmental Quality is also working on an interagency effort, expected to take several years, to develop a set of indicators that can inform policymakers in a fashion similar to the role of the Bureau of Labor Statistics' economic indicators in economic policy. The most substantial effort to date comes out of the private sector—a report from the H. John Heinz III Center for Science, Economics, and the Environment titled *The State of the Nation's Ecosystems: Measuring the Lands, Waters, and Living Resources of the United States* (2002).

This fresh competition is most welcome and does not, we think, make our report obsolete. *The Index of Leading Environmental Indicators* was always intended to be short (no more than 60 pages, so that journalists and interested citizens stand a chance of getting through it) and expository rather than compendious. The growing number of environmental indicator projects offers the opportunity for our report to evolve into a yearbook of sorts, with lead author Steven Hayward offering analysis and commentary on the major environmental issues.

As in every edition, this *Index* presents updated trend data on air quality, water quality, and toxic substances and provides a special section on a topic of current interest. In past editions, special sections have discussed toxic risk assessment, sustainable development, energy, and biodiversity. This year's report takes a closer look at America's forestlands, where catastrophic summer fires and political debate over federal regulation have put the issue front and center.

As in the last several editions, we also offer a roundup of notable new books, studies, and scholarship from the scientific press. And with this edition we begin a new regular feature: a review of media coverage of the environment, highlighting the best and worst of environmental journalism.

We hope you find this year's edition a useful resource and we welcome your comments.

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INTRODUCTION: THE YEAR IN REVIEW

In a dramatic turning point for environmental policy, the 2002 U.N. World Summit on Sustainable Development in Johannesburg, South Africa affirmed that economic growth is a prerequisite for improving the world's environment. This should translate into a greater reliance on market-based policy solutions. However, many environmental issues remain as contentious as ever—climate change, sustainable development, food production, and urban growth.

The “year in review” introduction of the *Index* provides a thorough analysis of the current scholarship on these topics. And it demonstrates that environmental controversies are nearly always more complicated than the popular story line, and that the legal and institutional means for dealing effectively with them are rarely as obvious as we might think.

ARE WE FINALLY GROWING UP?

The year 2002 may have seen a turning point in environmental thought that has been a long time in coming. The U.N. World Summit on Sustainable Development in Johannesburg, South Africa, in September affirmed the centrality of economic growth as the prerequisite for improving the world's environment.

This may not at first seem like real news, as the link between economic growth and environmental protection has already been acknowledged, even among most environmentalists. The admission, however, has always come grudgingly. And the shadow of the old "limits to growth" mentality lingered on through the evasions of sustainable development, which in plain use was a euphemism for "less development," or at least for wishful thinking that there can be economic development without natural resource development. In Johannesburg, this climate of wishful thinking came to the end of the road.

Many delegations, especially from developed nations, came to Johannesburg hoping and expecting that the summit would set specific targets to limit fossil fuel use and to adopt costly and exotic renewable energy for the poorest nations of the world. They also expected a pledge of higher wealth transfers from developed nations to poor nations. It didn't happen. The final 173-page declaration the summit adopted has the usual diffuse character of U.N. declarations, with vague language and ambiguous terms that allow different parties and interests to place different shades of meaning and emphasis on key terms.

For example, environmental lobbies see "civil society" as a term of art approving of the role of Non-Governmental Organizations (NGOs). In contrast, the United States is content to allow the term to be a stand-in for greater emphasis on private sector, market-oriented development over government-driven development, which was a key theme of U.S. negotiators at Johannesburg. But the specific applications—reducing poverty through economic growth, developing adequate water supplies to developing nations, and

linking foreign aid to good governance and free markets—represent a turning away from the Malthusian, wealth-redistribution mentality that prevailed at previous U.N. environmental summits. They also represent a new emphasis on wealth creation.

The intellectual consensus in favor of wealth creation as the foundation of environmental quality has become so overwhelming that it can no longer be denied or controverted. Many environmentalists were unhappy about this outcome, which is one reason why Secretary of State Colin Powell was jeered during his speech at the summit.

One NGO-produced newspaper at the summit ran the banner headline: "Summit Hijacked." The Worldwatch Institute expressed its disappointment in this year's edition of its annual *State of the World* report by saying that the Johannesburg declaration was "something between a modest step sideways and a small step backwards."¹ This is surely an understatement of their candid opinion, as a close reading of the Worldwatch Institute's complete analysis makes clear.

On the other hand, conservative and market-oriented groups in the U.S. and Europe have expressed satisfaction at the Johannesburg outcome. This has never happened before in the aftermath of a U.N. environmental summit.

The final turn in this debate is occurring as this report goes to press—the publication of Prof. Jack M. Hollander's important book, *The Real Environmental Crisis: Why Poverty, Not Affluence, Is the Environment's Number One Enemy* (University of California Press). This is the environmental book of the year, and most

THE INTELLECTUAL CONSENSUS IN FAVOR OF WEALTH CREATION AS THE FOUNDATION OF ENVIRONMENTAL QUALITY HAS BECOME SO OVERWHELMING THAT IT CAN NO LONGER BE DENIED OR CONTROVERTED.

environmental activists will either ignore or attack it in the same fashion as Bjørn Lomborg's *The Skeptical Environmentalist*.

A few excerpts provide the flavor of *The Real Environmental Crisis*:

No doubt, a certain level of consciousness raising by scientists and environmental groups is essential to develop and maintain people's sensitivity to environmental problems. But there is a big difference between advising caution on a slippery road and crying "fire" in a crowded theater. We've had too much of the latter, in the name of environmentalism...

In the United States the air is cleaner and the drinking water purer than at any time in five decades; the food supply is more abundant and safer than ever before; the forested area is the highest in three hundred years; most rivers and lakes are clean again; and, largely because of technological innovation and the information revolution, industry, buildings, and transportation systems are more energy- and resource-efficient than at any time in the past.

The central argument of this book is that *the essential prerequisites for a sustainable environmental future are a global transition from poverty to affluence, coupled with a transition to freedom and democracy.* [Emphasis in original.]

Readers will immediately recognize that Hollander is taking direct aim at Paul Ehrlich's famous thumb-nail formula of $I = PAT$, where I is human impact on the earth, with P standing for population, A for affluence, and T for technology.



It is going to be difficult for romantic environmentalists to demonize Prof. Hollander in the same fashion as Danish statistician Bjørn Lomborg.² Hollander is an emeritus professor of energy and resources at the University of California at Berkeley, and a prominent climate researcher at Lawrence Livermore National Laboratory, where much of the leading research on climate change is being conducted. He has published more than 20 books and 100 academic articles in the field.

This debate is over. Practical, common sense environmentalism has won on the intellectual level.³ Some day, perhaps, policy will follow. But while the consensus about economic growth and environmental sustainability is finally maturing, general public discourse over the environment is more contentious than ever.

This is due to a combination of factors, but the leading reason is always politics.

SOUND AND FURY

The environment has become a highly partisan issue in American politics, although this was not always the case.⁴ Public opinion polls typically show that Democrats have a huge advantage over Republicans as the party best able to protect the environment, with a margin of superiority often as high as three to one.⁵ And after the 2002 election, in which Democrats lost most of their domestic issue advantages, it can be expected that they will turn up the rhetorical volume on the one issue where they still enjoy a clear-cut advantage with voters.

We can see this already in the reaction to the Bush Administration's decision to reform the New Source Review regulations of the Clean Air Act, which will be taken up more fully in the air quality section of this report. Even though many of the changes the EPA is making were long under development during the Clinton administration, and even though some Democratic-leaning thinkers such as the Progressive Policy Institute have endorsed these changes, the rhetorical reaction from Democrats has been severe, verging at times on suggesting that the Bush administration might as well have repealed the Clean Air Act. Meanwhile, most of the more politicized national environmental groups have the Bush administration in their crosshairs.⁶

Criticism over policy disagreements is fair game, of course. But we note that the Bush administration has gotten little or no public credit from environmentalists for advancing or upholding tough rules that industry opposes, such as the new diesel emission standards. It is hard to escape the impression that many environmental lobby groups (as opposed to research and conservation organizations) have become *de facto* adjuncts to the Democratic Party in the same fashion as the National Rifle Association is to the GOP.

To be fair, it should also be noted that many of the more politicized environmental groups were not much happier with the Clinton administration. But this may tell us more about the permanent dyspepsia of environmental groups than it does about policy differences.

In 1998, for example, the National Environmental Trust blasted the Clinton administration for its "intransigence," for "abandoning the core principles of the [Kyoto] global warming treaty," and for "abandoning any pretence of living up to its rhetoric about cutting global warming pollution."⁷ And in a speech in April of last year Eileen Claussen of the Pew Center on Global Climate Change, one of the leading advocacy groups for urgent action on the issue, had harsh words for the Clinton administration: "Finally, I'd like to offer a special posthumous award to the Clinton administration. For talking big about climate change on the international stage but doing next to nothing about it at home, I present the Clinton White House with the award for best costumes."⁸

It is not clear the din of criticism directed at the Bush administration will have much political impact.⁹ An ABC News/*Washington Post* poll in December 2002 found that voters *approved* of President Bush's handling of the environment by a 50–40 margin, which was slightly better than his ratings on the economy. A January CNN/*Time* magazine poll reported a similar result, with Bush's approval-disapproval rating at 47 to 40. The Gallup/CNN/*USA Today* poll in mid-February 2003 found Bush's approval rating on the environment rising, to 53 percent positive and 37 percent negative (up from a low point of 46–44 in April 2001).

A *Los Angeles Times* poll in early February found a similar result, with respondents approving Bush's handling of the environment by a 48 to 30 margin. Moreover, the "internals" of the ABC/*Post* poll suggest that there might not be much political headway to be gained through the issue because few voters find the environment to be a pre-eminent issue.

When placed among a list of 10 issues, including terrorism, health care, education, Social Security, and so forth, the environment came in *last* as the issue voters thought should receive the highest priority. No wonder the greens seem so blue.

CLIMATE CHANGE

January brought the news that U.S. emissions of greenhouse gases—particularly CO₂—declined by 1.2 percent in 2002, the largest drop in more than a decade. Yet environmentalists did not cheer this unexpected news. Nor did they argue that it means that the U.S. could, by 2010, make serious progress toward the Kyoto goal of reducing greenhouse gas emissions by 10 percent below 1990. This silence was for an obvious reason: the decline was attributed mostly to the economic slump, which was relatively mild by historical standards, and which gives credence to the many estimates that achieving the Kyoto target would impose enormous costs on the U.S. economy over the next decade.¹⁰

The second explanation raises even more counter-intuitive problems: a warm winter in 2002 is said to have depressed fossil fuel use. But if the planet is warming because of fossil fuel use, and fossil fuel use goes down with warmer weather, then...

While many of the regulatory issues that are the focus of fury from environmental organizations may not resonate deeply with the public or long remain on the front pages of newspapers, climate change is sure to remain front and center. One of the sources of discord at the Johannesburg summit was the backdrop of the Bush administration's decision in 2001 to withdraw from the Kyoto treaty.

The Bush decision to reject the Kyoto approach ranks high among the divisions between the U.S. and Europe at the present time. Yet the year 2002 may have seen the outline of a new consensus starting to emerge. One sign of movement on the issue was a surprisingly level-headed analysis of the American perspective on climate change policy coming out of France.

The U.S. emissions targets were far more ambitious than those for any European nation, and therefore neither economically nor politically realistic. That was the conclusion of Pierre Lepetit and Laurent Vignuiet of Le Centre Français Sur Les Etats-Unis (French Center on the United States) in *The United States and Climate Change*, a July, 2002 publication. But Lepetit and Vignuiet go on to point out that the outcome of U.S. climate policy would have been little different even if Bush had tried to keep on the same course as the Clinton administration, a point we made in this report last year:

The breadth of criticisms of the Bush administration made it appear that the President's decision was a drastic reversal of U.S. policy. A close look at the U.S. climate change policy for the last ten years shows that such is not the case. Ever since the Clinton administration agreed to the protocol in December 1997, Congress has expressed its disapproval, and little was done to hammer out guidelines for domestic implementation.

Rhetorically committed to reducing emissions, the Clinton administration made it harder to meet the challenge to push the United States toward binding commitments which antagonize too many interest groups and confused American public opinion. After ten years of an adversarial approach, which resulted in deadlock, the

JANUARY BROUGHT THE NEWS THAT U.S. EMISSIONS OF GREENHOUSE GASES—PARTICULARLY CO₂—DECLINED BY 1.2 PERCENT IN 2002, THE LARGEST DROP IN MORE THAN A DECADE.

gradual approach of the Bush administration might help to construct a constituency for action.¹¹

The authors add that “A dramatic short-term reduction [of CO₂] might entail damaging economic consequences and, in turn, jeopardize the ability to invest in the long-run scientific and technological solutions.” “The objections are serious,” the authors conclude, “and Europeans cannot bury their heads in the sand and say that all these arguments are irrelevant.”¹²

Neither should *Americans* brush aside these arguments, as was adumbrated further in economist Thomas C. Schelling’s feature article in the May/June 2002 issue of *Foreign Affairs*.¹³ Schelling observed: “The percentage reduction of greenhouse-gas emissions to which the United States committed itself by signing the 1997 Protocol to the 1992 U.N. Framework Convention on Climate Change was probably unachievable when the protocol was adopted.” Bush may not have made the best choice in rejecting Kyoto outright, Schelling thinks, but given the political and economic realities “Bush ... at least avoided hypocrisy.”

The cornerstone of rethinking climate change policy in Schelling’s mind is adopting a longer time horizon for our actions, for economic, technological, and climate reasons. “[A]ny reasonable rationing scheme should contemplate a timeline of at least a century, not a few decades... [T]he technologies needed to drastically reduce fossil-fuel consumption through alternative energy sources, greater energy efficiency, and sequestration of carbon dioxide or its removal from fuel are not developed. Decades of investment are needed.”

Schelling’s point about the need for technological development was taken up in more detail in a widely noted article in *Science* magazine, “Advanced Technology Paths to Global Climate Stability: Energy for a Greenhouse Planet,” authored jointly by many of the most prominent climate scientists and energy

experts in the nation.¹⁴ The article notes that world energy demand can be expected to triple over the next 50 years, and that “Energy sources that can produce 100 to 300 percent of present world power consumption without greenhouse gas emissions do not exist operationally or as pilot programs.” The bulk of the article reviews the potential for various non-carbon based energy sources, including nuclear, solar, fuel cells, and wind, finding each to have limited potential.

There is not enough uranium for widespread nuclear power for more than a few decades; solar electric generation on a mass scale requires enormous amounts of land (supplying U.S. electricity needs would require a solar array covering nearly 16,000 square miles, an area larger than New Jersey). While renewables can be a piece of the energy mix, the article points out that “renewables are intermittent dispersed sources unsuited to baseload without transmission, storage, and power conditioning. Wind power is often available only from remote or offshore locations.” The article also speculates about more exotic alternatives, such as space-based solar power and “geo-engineering.”

The article concludes with much the same point made by Schelling and the French study: “Combating global warming by radical restructuring of the global energy system could be the technology challenge of

“THE GREENHOUSE GAS ISSUE WILL PERSIST THROUGH THE ENTIRE CENTURY AND BEYOND. EVEN THOUGH THE DEVELOPED NATIONS HAVE NOT SUCCEEDED IN FINDING A COLLABORATIVE WAY TO APPROACH THE ISSUE, IT IS STILL EARLY. WE HAVE BEEN AT IT FOR ONLY A DECADE.”

THOMAS C. SCHELLING

“WHAT MAKES GREENHOUSE SENSE?”

FOREIGN AFFAIRS, MAY/JUNE 2002

the century... [I]t requires the recognition that, although regulation can play a role, this fossil fuel greenhouse effect is an energy problem *that cannot be simply regulated away.*" [Emphasis added.]

There is disagreement about whether a new policy strategy should center around a government-sponsored Apollo-style program to develop breakthrough energy technologies, which risks the usual problem of erecting path-dependent subsidies that are difficult to get rid of once in place. An unorthodox alternative might be for the government to offer a series of very large cash prizes (perhaps as much as \$1 billion) to the private sector for specific breakthroughs in energy technology.

For example, such a prize might be offered for the development of a practical hydrogen storage system for automobiles. This kind of approach is not unprecedented: the U.S. government offered such a prize to speed along the early development of the airplane, which the Wright brothers won, and the British government offered a prize for the development of an accurate sea-going clock in the 18th century.

All of which brings us to the fourth large theme of 2002.

WHAT WOULD WHO DRIVE?

The *kulturkampf* over sport utility vehicles (SUVs) reached critical mass in 2002 and the early months of 2003 through three widely publicized vehicles, so to speak. A church group that calls itself the National Religious Partnership for the Environment, apparently more interested in saving gas than saving souls, launched a "What Would Jesus Drive?" campaign, with the point being that Jesus wouldn't drive an SUV. Perhaps this represents progress of sorts for the religious left, which has gone from saving the world from nuclear warheads in the 1980s to saving the world from Ford Explorers today.

Then came the Detroit Project, which scored the usual disproportionate quantity of free media exposure by producing TV ads that, borrowing from the TV



ads for the drug war, allege SUV drivers indirectly support terrorism because we import oil from the Middle East. *New York Times* reporter Keith Bradsher brings a more serious critique of SUVs in his book *High and Mighty: SUVs—The World's Most Dangerous Vehicles and How They Got That Way* (Public Affairs Press).

Gregg Easterbrook, who usually sets his sails against the prevailing winds, joined the case against SUVs with a long cover story in *The New Republic* ("Axle of Evil: America's Twisted Love Affair with Sociopathic Cars," January 20, 2003). Easterbrook criticizes SUVs as "the root cause" of road rage, for diminishing improvements in air quality, and for wasting gasoline. With the

THE CONTROVERSY OVER SUVs PROVIDES AN EXCELLENT EXAMPLE OF HOW AN ENVIRONMENTAL ISSUE CAN SPILL OVER INTO A WIDER SOCIAL COMPLAINT ABOUT MODERN AMERICAN LIFE.



exception of fuel economy, these contentions are debatable. Road rage is an exaggerated phenomenon, as is the air-quality impact of SUVs (discussed later in this report), and Easterbrook should know better than to invoke the “root causes” of any social phenomena.

Beyond the aspects of SUVs that are susceptible to factual analysis and argument, there is the larger argument that SUVs are antisocial. “These machines are



Just Not with Their Dollars

A pro-environment sticker on the bumper of a Ford Explorer SUV.

designed to bring out the worst in their owners,” Easterbrook writes. SUVs are now deliberately designed to look “menacing” and “nasty.” “There are lots of self-centered and self-absorbed people with little interest in their neighbors,” Easterbrook writes. “Somebody finally made a class of vehicles designed to bring out the worst in them.” SUVs “have been designed to look as threatening as possible” and are “sold by appealing to belligerence.”

The controversy over SUVs provides an excellent example of how an environmental issue can spill over into a wider social complaint about modern American life. This appears to be a worthy successor to the social critics of the 1950s who fixated upon automobile tail fins as a moral symbol of American material excess.¹⁵ Like cars with gaudy tail fins, SUVs will probably fall out of fashion in the fullness of time, which may be starting to happen already. The *Washington Post* observed in January that there is “a pronounced shift in the car-buying habits of Americans, who are turning away from the long-popular truck-based SUVs built by U.S. automakers and embracing import SUVs that handle like cars.”¹⁶ And a *Wall Street Journal* headline declared: “Detroit Worries Some Consumers Are Souring on Big SUVs.”¹⁷

It should be noted that SUVs meet the practical needs of families who used to buy station wagons, which declined in part because of auto fuel mileage regulations from which SUVs are partially exempt, and who don't like minivans. This appears to be the case even among environmentally-minded drivers, as the photo on the previous page shows.

The SUV controversy helped increase interest in alternative automobile technologies, especially gas-electric hybrid cars and prototype fuel cell vehicles. Fuel-cell vehicles are said to be at least 10 years off, which is the kind of phrase that in the past has usually been a sure-fire indication that the breakthrough¹⁸ technology will not, in fact, break through.

Gas-electric hybrids now offer a small four-cylinder gasoline engine and an electric motor that provides supplemental power during acceleration, which is when gasoline engines use a lot of fuel. They represent a large improvement over the all-electric car designs that have been pursued in California and elsewhere to little success. But right now hype about hybrids exceeds sales by a large margin. In 2001, just 20,000 hybrids were sold out of a total of 17 million new cars sold in the U.S. (Worldwide hybrid sales are said to be about 150,000.) By 2006 market researchers think hybrid sales might increase to a half million.

The small hybrids currently on the market (the Toyota Prius and the Honda Insight) can get more than 50 miles per gallon but cost about \$2,500 more than a regular gas-only model. Even at this premium, the cars are being sold at a loss; how much of a loss car makers won't say. Production costs will probably fall if volume increases. Toyota, in fact, has pledged that by 2012, its entire fleet of cars will be hybrid. But a more interesting question is whether hybrid fuel efficiency gains can be achieved in the larger sedans, SUVs, and minivans that most Americans prefer to drive.

Ford plans to bring out a hybrid version of its small SUV model, the Escape, which will get about one-

third better gas mileage than the current gas-only model (40 mpg for the hybrid vs. 23 mpg for the gas-only model). But at larger sizes the fuel economy advantage diminishes rapidly. GM plans to offer a hybrid version of its mid-sized Chevy Sierra SUV and Chevrolet Silverado pickup truck in 2004, but these larger-sized vehicles will only get about two mpg more than a gas-only model.

If improvements in hybrid technology allow the production of nasty-looking, full size SUVs with higher fuel efficiency, how will the SUV critics complain then? Maybe another recent *Wall Street Journal* headline provides a clue: "New 'Extreme Sport' Is Getting Car Radios too Loud to Listen to."

NOTABLE RECENT SCHOLARSHIP

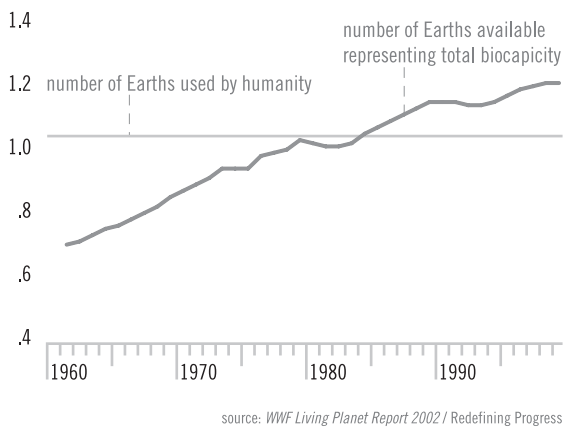
1. BIGFOOT SIGHTED AGAIN!

In the run up to the Johannesburg summit on sustainable development last summer, there was fresh attention devoted to determining the "ecological footprint" of human civilization. One particular study, which came out in two different versions, captured wide media attention. The two versions of the study are: Mathis Wackernagel, *et al.*, "Tracking the Ecological Overshoot of the Human Economy," from the think tank Redefining Progress,¹⁹ and the *Living Planet Report 2002*, published by the international World Wildlife Fund.²⁰

Both studies are pessimistic in the same fashion as the famous 1972 *Limits to Growth*, a work that has long been discredited. The twin studies employ a methodology that converts human activities into a

CONVERTING HUMAN IMPACT ON THE PLANET INTO A SIMPLE METRIC OF LAND AREA IS A THOUGHT-PROVOKING WAY OF CHALLENGING OUR UNDERSTANDING OF SUSTAINABILITY, BUT IT IS STATIC, INCOMPLETE, AND ALMOST CERTAINLY WRONG.

FIGURE ONE: WORLD ECOLOGICAL FOOTPRINT, 1961–1999



measurement of the land area required to support these activities. Like the legendary creature Bigfoot, the studies conclude that humans have a large and heavy footprint on the earth's ecosystems: "Human activities have exceeded the biosphere's capacity since the 1980s." As a result, the earth can no longer regenerate itself fast enough to keep up with human demands.

Both studies feature an ominous line graph of "Number of Earths Used by Humanity," showing the line crossing the 1.0 mark in 1978. By 1999, the chart suggests, humans were using the equivalent of 1.2 earths, as shown in Figure 1. The World Wildlife Fund version of this study (which curiously wasn't posted or linked on the U.S. World Wildlife Fund website) predicts that ecological collapse will arrive by the year 2050 unless major changes are made.

The findings of these two studies depend on the assumptions of a model that converts human impacts into a land-area equivalent, which the authors candidly admit allows for large variance in outcomes if different assumptions are made.²¹ The largest variable in these studies is the amount of land area required to sequester all of mankind's carbon dioxide emissions such that there would be no increase in CO₂ levels in the atmosphere. If the model's assumptions about the sustainable range of

changes in CO₂ levels, or what other potential sequestration techniques might be substituted, are changed, the results of the model would be dramatically less alarming.

Converting human impact on the planet into a simple metric of land area is a thought-provoking way of challenging our understanding of sustainability, but it is static, incomplete, and almost certainly wrong. It does not allow for dynamic tradeoffs, such as the way the automobile reduced urban pollution from horses and conserved nearly 100 million acres of land in the U.S. in the early part of the 20th century. The model is not helpful to policymakers, in part because large technological changes and new environmental tradeoffs occur less as a result of national policy than the serendipity and trends of the marketplace.²²

2. MORE WILDERNESS THAN WE THOUGHT

Another reason to doubt the probity of sophisticated models of humanity's "ecological footprint" comes from an equally well-publicized study by Conservation International's Center for Applied Biodiversity Science. Published in late 2002, *Wilderness: Earth's Last Wild Places* found that 46 percent of the earth's land area is still wilderness—a much higher area than commonly supposed. One news report noted that the unexpected finding was "a surprising cause for optimism." "A lot of the planet is still in pretty decent shape," said Harvard primatologist Russell Mittermeier, the lead author of the study. "We should be happy about that."

Nearly 200 prominent environmental scientists participated in the study, which defined wilderness as an area of at least 10,000 square kilometers in size (which is about the size of Yellowstone National Park), populated by fewer than one person per square kilometer, and containing at least 70 percent of its original vegetation. The total area of wilderness came to 68 million square kilometers, a land area more than seven times the size of the United States. Only 144

million people, or 2.4 percent of total world population, live on this land area.

The study's authors note that only about seven percent of the wilderness areas they identified are permanently preserved, and they call for additional conservation measures. Large wilderness areas are necessary to prevent habitat fragmentation, which is the leading cause of species extinction. The larger inventory of wilderness than previously supposed suggests that the strategy of preserving biodiversity "hot spots" (a subject discussed in the 2002 edition of this report) can proceed without significantly impinging on human development needs.

3. A CLICHÉ RAN THROUGH IT

The Cayuhoga River fire of June 22, 1969, is one of the totems of modern environmentalism, regarded as a defining moment in environmental awareness and subsequent federal legislation to deal with such problems. The Cayuhoga fire became one of the leading environmental clichés: "Our rivers were so polluted that one even caught fire, giving rise to the demand for new federal environmental laws."

The fifth edition of this *Index* made note of the infamous event for what it tells us about the socioeconomic basis for the popularity of environmentalism:

The reaction to the Cayuhoga River fire is an excellent illustration of what economists call the "wealth effect," i.e., how the public demands higher environmental quality as society becomes more affluent. The Cayuhoga, which the mayor of Cleveland had described as an "open sewer" as far back as 1881, had caught fire twice before, in 1936 and 1952. There was no fanfare or general outrage then; it was regarded as the price of progress. By 1969 such a price was no longer acceptable. The Affluent Society did not want to be the Effluent Society.

While some environmentalists at the extreme fringe attack modern industrial society, it is rising wealth that has made environmentalism not only popular, but possible. "These wild things," Aldo Leopold reminds us in *A Sand County Almanac*, "had little human value until mechanization assured us of a good breakfast."

Jonathan Adler of Case Western University School of Law has now added to the discussion with a 13,000-word article in the *Fordham Environmental Law Review*. Adler delves deeper into the history of the Cayuhoga, its fires over the years, and the conventional wisdom that nothing was being done to remedy the problem prior to the Federal Water Pollution Control Act of 1972. "Much of the Cayuhoga story is mythology, however, a fable with powerful symbolic force," Adler writes. Much of what we know about the 1969 fire is simply false.

Adler examines the details of the Cayuhoga's history, finding that the river's pollution was probably at its worst in the 1950s, at which time local businesses began demanding that something be done about it. Indeed, the much more severe Cayuhoga River fire of 1952 was a catalyst for early efforts to clean up the river. By the early 1960s local interests had formed the Cayuhoga River Basin Water Quality Committee, and begun the first steps in cleaning up the worst of the river's pollution. In 1968 voters in Cleveland passed a \$100 million bond for water clean-up efforts; expected federal matching funds, however, failed to come

THE MASSIVE PUBLIC SUPPORT FOR SWEEPING NEW FEDERAL ENVIRONMENTAL LAWS IN THE EARLY 1970S WAS LESS A NEW FORCE THAN IT WAS AN EXTENSION OF PUBLIC AWARENESS AND EARLY PUBLIC ACTION ON THE LOCAL LEVEL.

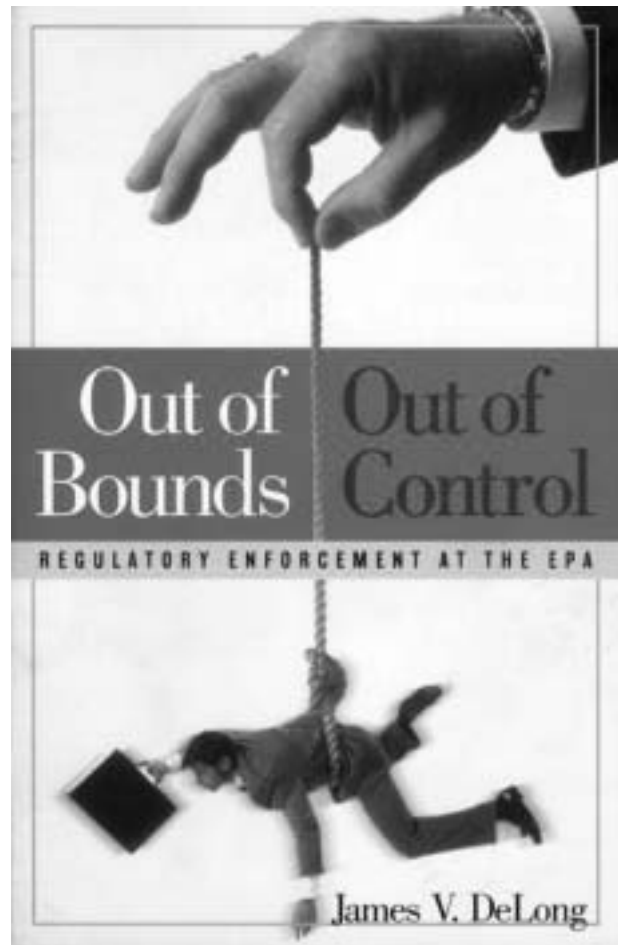
through, delaying the locally initiated effort to begin serious clean up. In addition, a number of nuisance lawsuits were brought to compel clean up, but were ineffective because existing regulatory permit systems preempted common-law remedies.

Adler notes that Cleveland was hardly unique in starting efforts to clean up local water pollution. The point is that state and local governments were not the laggards in environmental consciousness that they are often thought to be, while federal statutes prohibiting pollution, some of which dated back to the 19th century, went unenforced. Local officials in Cleveland actually criticized the federal government in the early 1970s for coming late to the issue of water quality. Adler also points out that federal government facilities were responsible for a significant amount of pollution to the Cayuhoga and Lake Erie, contrary to the common view that private industry is the sole source of pollution.

Adler's revisionist account of the Cayuhoga story reminds us that the complete circumstances of many environmental conditions are usually more complicated than the popular story line, and that the legal and institutional means for dealing effectively with environmental problems are not as obvious as we might think. The massive public support for sweeping new federal environmental laws in the early 1970s was less a new force than it was an extension of public awareness and early public action on the local level.

4. SHORT NOTICES

About two years ago, *60 Minutes* broadcasted a segment harshly critical of the Environmental Protection Agency's enforcement activities, observing that the EPA has been guilty of the kind of abuses—falsifying evidence, warrantless searches, false imprisonment—that if conducted by a local enforcement agency would raise the hackles of civil libertarians and catch the jaundiced eye of the courts. One of the companies *60 Minutes* profiled later won a court judgment against



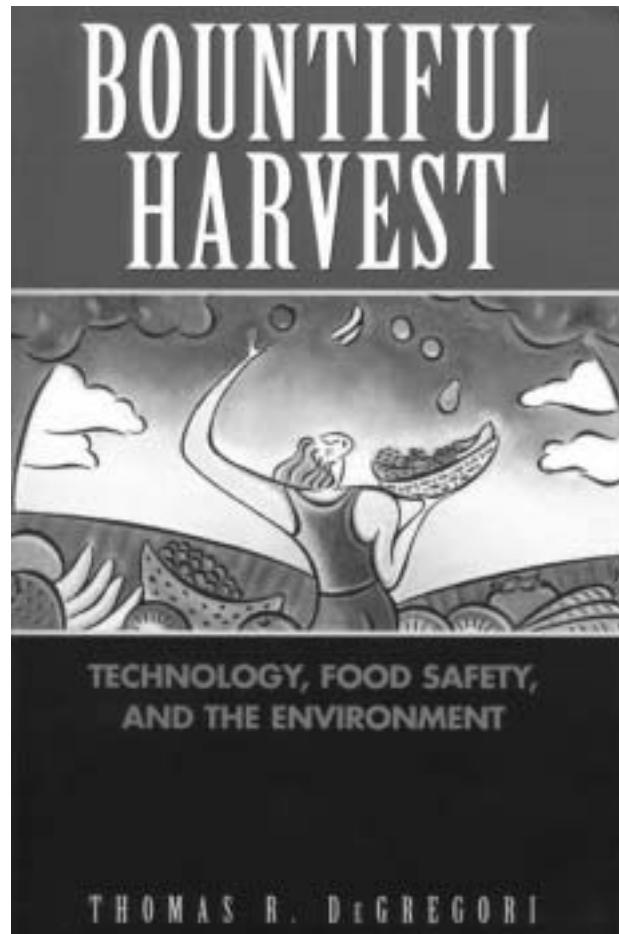
the EPA for the agency's abuses. Attorney James V. DeLong has produced a systematic examination of this problem in a new book, *Out of Bounds, Out of Control: Regulatory Enforcement at the EPA* (Washington, D.C.: Cato Institute, 2002).

Bureaucratic government is supposed to have the redeeming virtue of avoiding arbitrariness through the consistent application of uniform rules, or at least that's the theory. However, the vagueness of many environmental statutes, the ad hoc permit and regulatory negotiations between agencies and private parties, and the abuse of administrative discretion combine to make the EPA one of the most arbitrary agencies in government. Some of the fault for this lies with Congress for writing "aspirational" statutes whose difficult or impossible targets practically invite arbitrary implementation by the EPA.

A statute that sets a standard, for example, of zero discharge of pollutants into water means that strict compliance is virtually impossible. In such circumstances, the EPA has complete discretion to treat even technical violations as either a minor administrative matter or a criminal case, and as the EPA often changes the rules or its interpretation of existing rules, hundreds of parties can find themselves suddenly out of compliance with little or no notice.

Such problems of bureaucratic rule-making are not unique to the EPA, and DeLong argues that piecemeal reforms are unlikely to make much difference. DeLong lays out the case for reviving the non-delegation doctrine (and democratic accountability) by making Congress cast votes to enact new regulations. He also argues that the Supreme Court should continue its process of revising the so-called *Chevron* doctrine, arising from a 1984 case entitled *Chevron v. Natural Resources Defense Council*, in which the Court said maximum deference should be given to administrative agencies in interpreting ambiguous statutes. The Supreme Court has subsequently recognized that the *Chevron* doctrine amounts to a bureaucratic hunting license, and has nibbled at the margins of *Chevron* in recent cases, setting the stage for a rebalancing of bureaucratic power in future cases.

Few topics generate as much heat and as little light today as the issue of modern agricultural technology, which comprises genetically modified foods, pesticides, agri-chemicals, and other technological innovations that have transformed food production and human well-being in recent decades. Thomas R. DeGregori of the University of Houston tackles this difficult bundle of issues in *Bountiful Harvest: Technology, Food Safety, and the Environment* (Washington, D.C.: Cato Institute, 2002). DeGregori places the specific controversies within the context of the long tradition of technophobia, a perennial phenomenon of human experience stretching back to antiquity.



DeGregori removes the veil over this substratum of social thought, including a chapter showing how many of the views of today's animal rights activists and other extremists were foreshadowed by Nazism. It has always been considered bad taste, at the very least, to bring up these parallels, and is usually dismissed as another abuse of the debate tactic known as *reductio ad Hitlerum*. DeGregori is quick to disclaim the implication that environmental thought leads ineluctably to totalitarianism; his point, rather, is to focus our attention on the paradox that the repudiation of reason and technology in the name of elevating humanity can have the opposite effect.

News flash: The world is going to come to an end after all! So say "astrobiologists" Peter D. Ward and Donald Brownlee in their new book *The Life and Death of*

Planet Earth: How the New Science of Astrobiology Charts the Ultimate Fate of Our World (Times Books, 2002). You can relax: the authors say the end won't arrive for another five billion years or so, when the sun will start to swell, eventually frying the Earth.

Forget global warming: we have several appointments with ice ages on our calendar in the distant future, and then the specter of how to deal with the slowly expanding sun five billion years from now (one idea: move the Earth out to a more distant orbit) makes our current concern with climate change seem trivial.

More interesting than the particular predictions of future cycles of life on Earth in the distant future, which the authors admit have huge uncertainties, is the arrival of the perspective of "astrobiology," which promises to take its place alongside "sociobiology" as an interdisciplinary approach to earth science.

The semi-popular scientific media, especially *Nature*, *Science*, and *Scientific American* magazines, continued their tradition of publishing cutting-edge news and research on the environment. Often their stories break out into the daily newspapers and network broadcasts, and are worth a second look.

Smart growth goes global: Some environmentalists have the unusual knack for taking lemonade and making lemons out of it. Take the latest twist on population forecasts. Fertility rates around the world are falling so fast that the U.N. now projects world population will peak within the next 50 years, after which it may begin *falling* rapidly.

This should be unmitigated good news to those who have worried for the last generation about the population bomb. Alas, no.

A major reason for the decline in fertility rates, as iconoclast Julian Simon argued would turn out to be the case, is rising incomes. And rising incomes mean more consumption, even if there are fewer people to do the consuming. Even though average household size is falling, the number of households is not. *Nature*



magazine in January 2003 looks at this issue and pronounces it a problem.²³ "More households containing fewer people are more damaging to the environment than simple population growth." It comes as no surprise that the irrepressible Paul Ehrlich is one of the authors of this work.

Smaller households, the authors argue, mean more households—155 million more in the developing world than there would have been had household size stayed at 1985 levels. Even divorce can be seen to have an environmental effect, as divorce adds to the formation of new small households. Finally, environmentalists and social conservatives see eye-to-eye about something. Perhaps environmentalists will now come out against no-fault divorce on demand.

One of the authors told *Nature*, "This may be a wake-up call that everything we do, including personal freedom and personal choice, may have an impact on the environment." The punchline: "policy interventions

will have to focus on the average household resource consumption, in order to combat the adverse effects of smaller households.” And you thought urban sprawl was just an American problem.

As is so often the case, the contrary perspective can also be found in the pages of *Nature*, this time in an article from August 2002 entitled “Malthus foiled again and again.”²⁴ Molecular biologist Antony Trewavas points out how innovation has always outstripped the static projections of resource use, especially in agriculture. “Current agricultural technology enables one person to be fed from the food grown on no more than 2,000 square meters. In Malthus’s time it was nearer to 20,000 square meters... Since 1950, the proportion of the land devoted to farming has barely increased, even though the world population doubled over that same period... Agriculture has repeatedly met Malthusian watersheds—and has overcome them.”

During the massive forest fires in the western U.S. last summer (discussed more fully later in this report), some observers wondered how much air pollution they generated, and especially how much CO₂, since woodlands are one of nature’s primary methods of CO₂ storage. The November 7, 2002 edition of *Nature* offered an important clue with a report about the results of a careful study of the emissions from the tropical peat bog fires in Indonesia that occurred in 1997.²⁵ The 1997 fires burned roughly 790,000 hectares, and produced carbon in the range of 13–40 percent of total man-made carbon emissions. These forest-fire emissions contributed to making 1997 the year that experienced the largest increase in atmospheric CO₂ since record keeping began in 1957.

TOO OFTEN HUMANS ARE LEFT OUT OF OUR ASSESSMENTS OF THE ENVIRONMENT AND ECOSYSTEMS, AS THOUGH WE HUMANS ARE NOT OURSELVES A PART OF NATURE.

5. THE INDICATORS’ INDICATOR

As mentioned in the Preface of this report, interest in environmental indicators has reached a critical mass in recent years, such that it may be appropriate to develop an indicator of indicators. The EPA has finally re-entered the fray with its own environmental indicators report, *The State of the Environment*. The first draft of the report was not yet available at press time (for updates, see www.epa.gov/indicate/). The outline suggests the EPA is going to integrate measures of human health into its indicator framework.

Too often humans are left out of our assessments of the environment and ecosystems, as though we humans are not ourselves a part of nature. Other federal agencies are also working on developing a framework for environmental indicators, all with an eye toward helping policymakers manage for results. The General Accounting Office (GAO) has its own project

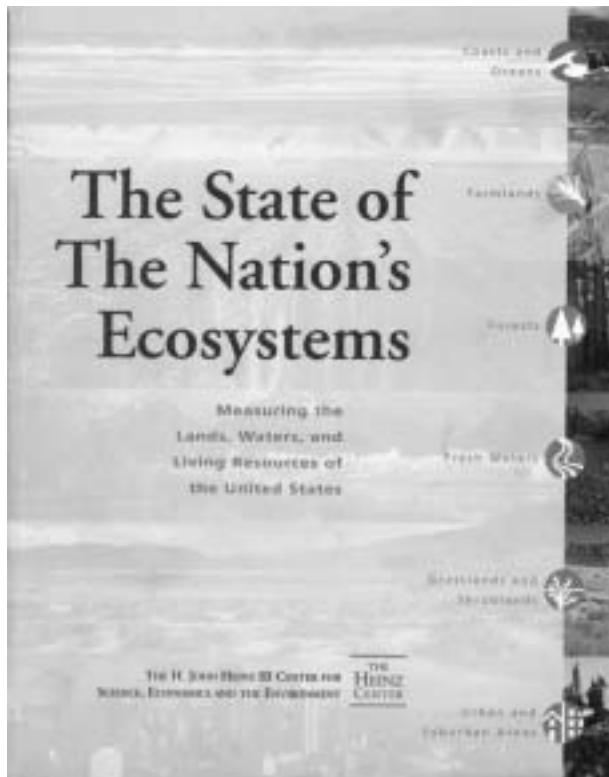
TABLE ONE: INDICATOR OF INDICATORS

Agency/Report	Focus
EPA/ <i>State of the Environment</i>	all
GAO/	all
Heinz/ <i>State of Nation's Ecosystems</i>	all
USFS/ <i>Sustainable Forestry</i>	forestlands
EPA,NOAA/ <i>Coastal Conditions</i>	ocean waters

underway, and the President’s Council on Environmental Quality (CEQ) is moving ahead with a long-term, inter-agency process to develop environmental indicators.

It is encouraging that the efforts of various federal agencies to develop a meaningful framework of environmental indicators amount to a willy-nilly form of competition. In addition to indicators aiming at a composite picture of the nation’s environment, there are subject-specific indicators under development.

For example, the U.S. Forest Service has recently released a draft of a major report on sustainable forestry. The EPA, in conjunction with the National Ocean and Atmospheric Administration (NOAA), has produced a report on coastal conditions in the U.S., and the National



Academy of Sciences completed an update of its 1985 study of oil pollution in American coastal waters. All three reports will be taken up in later sections of this *Index*.

By far the most substantial advance in developing environmental indicators has come out of the private sector, from the H. John Heinz III Center for Science, Economics, and the Environment. The Heinz Center's report, *The State of the Nation's Ecosystems: Measuring the Lands, Waters, and Living Resources of the United States*, is the product of a seven-year project, involving more than 100 prominent environmental researchers, to gather and analyze data on major aspects of environmental quality.²⁶

The State of the Nation's Ecosystems (hereinafter SONE or "Heinz Center report") examines 103 environmental indicators for six broad types of ecosystems: coasts and oceans, farmlands, forests, fresh waters, grass and shrublands, and urban areas. Examples of the kind of indicators in the report include soil biological condition, nitrate and phosphorus levels in streams and rivers, at-risk species counts

in different types of habitat, plant and tree growth, non-native species trends, and carbon storage in various kinds of plant matter.

The report aims where possible to offer "big picture" findings on the condition of ecosystems at the national level, as well as presenting trends on how ecosystem conditions may be changing. The report used only high quality data from consistent sources. Perhaps the most significant aspect of the report is its Joe Friday "just the facts, ma'am" approach to the data. The Heinz Center scrupulously resisted offering sweeping generalizations about whether environmental conditions and trends are "good" or "bad." Even though it contains plenty of troublesome information, SONE is utterly without the alarmist hype that usually accompanies reports from environmental groups. This admirable lack of hype is one reason the study failed to make the front page of newspapers or the evening network news.

The Heinz Center report is as important for what it *doesn't* say as for what it does. Of the 103 indicators selected, only 33 (or one-third) currently have adequate data on which to base conclusions; another 25 indicators (24 percent) have incomplete data sets. Thirty-one indicators (30 percent) have inadequate data, and another 14 indicators (14 percent) need further development to be of use.

CONCLUSION:

WHAT ANECDOTES CAN TELL US

A special section on biodiversity in the 7th edition of this report (2002) lamented that measurements of biodiversity are controversial and that trend data for biodiversity and species extinction are unreliable. As in so many areas, our perceptions are driven by a combination of scientific models in varying states of refinement and anecdotes. It is sometimes said that "the plural of anecdote is data," but we don't think so in this case. However, some of the anecdotal stories of the past year provide a window into ways in which the environmental ethic is affecting the prospects for species survival and recovery.

The media, of course, carried numerous stories of bad news that we have come to expect. The *Los Angeles Daily News*, for example, ran a story early this year about the apparently declining prospects for the desert tortoise in California, Nevada, and Arizona.²⁷ We say “apparently” because a reliable estimate of the tortoise population and its rate of decline is still at least five years away. Charles Bostwick’s *Daily News* story notes that biologists are uncertain about the cause of the tortoise’s rapid decline, and that despite more than \$100 million spent on behalf of the tortoise, the 7th-highest amount of spending ever for a single species-protection effort, no one can point to a convincing strategy for recovery.

Yet in the last year the media also reported on many cases of favorable species trends and recovery efforts. In September the *Boston Globe* revealed that the National Marine Fisheries Service had likely underestimated the number of cod and other fish in the waters off New England.²⁸ In May the Associated Press wire service ran a story about how fishermen in the northwest were employing “fish CPR” on wild salmon when they are inadvertently caught. (Wild Chinook salmon may not be caught at the present time; only hatchery-raised salmon, which have special markings, may be taken commercially.) Before returning a wild Chinook to the water, fishermen are using what is known as a “revival box” to aerate the gills of salmon. Using the revival box has a success rate of 94 percent (i.e., 94 percent of fish that appear dead when extracted from fishing nets have been revived through the process).

A November story in the *Portland Oregonian* noted a similar extraordinary effort in a road-widening project, where a “fish freeway” (essentially a stream restoration project) was integrated into the construction process as though it were merely another lane of roadway. And in California’s delta region, the number of endangered Delta smelt has risen so robustly, according to an October article in the *Contra Costa Times*, that biologists may soon recommend removing it from the endangered species list.²⁹

In Florida, the *New York Times* reported in February 2002, the manatee population appears to be on the increase after years of decline. Aerial surveys in 2001 counted one-third more manatees than in 2000.³⁰ Elsewhere in Florida, the number of endangered panthers is on the rise. Thirty panthers were born in 2002, the most in a decade. Twenty years ago the panther population was estimated to have dwindled to as few as 30 in the entire state; today the population is thought to be near 100. There is still considerable doubt about whether sufficient genetic diversity among the panther population exists for the long run, and land area constraints may place an insufficient upper bound on the panther population. But after years of decline, the recent trend is surprisingly good news.

And in Australia scientists announced one of the first efforts to revive an extinct species through cloning, a notion we speculated upon in this report three years ago. The Australian Museum in Sydney intends to clone a Tasmanian tiger, the last known member of which was seen in 1936.


While it is impossible to sum up these straws in the wind as a meaningful data trend, they do highlight our ability to think creatively about remedies for species decline. And that is another reason for enviro-optimism.

NOTES

- 1 *State of the World 2003*, Gary Gardner, project director (New York: W.W. Norton, 2003), p. xvi.
- 2 See my “Lomborg Gets the Galileo Treatment , or, ‘Shut Up,’ They Explained,” *Environmental Policy Outlook* (Washington, D.C.: American Enterprise Institute, January 2003), available at: www.aei.org/epo/epo14825.htm.
- 3 There is reason to believe we are turning the corner in the fight against world poverty as well. See Clive Crook, “The World Is Winning, Not Losing, the War on Poverty,” *National Journal*, January 24, 2003.
- 4 The bipartisan politics of modern environmental policy were analyzed at length in the fifth edition of this report (2000), available online at www.pacificresearch.org/pub/sab/index.html#Anchor-enviro.

- 5 See Karlyn Bowman, "The Politics of the Environment," *AEI Studies in Public Opinion*, October 16, 2002, available at www.aei.org/ps/psbowman14.pdf.
- 6 See the NRDC's "Bush Record" site at www.nrdc.org/bushrecord/default.asp; the Sierra Club made a point of taking down its explicitly anti-Bush material after September 11, 2001, and has not, as of press time for this report, resumed a direct attack on its website, although they have in direct mail fundraising.
- 7 www.commondreams.org/pressreleases/June98/060998a.htm.
- 8 Eileen Claussen, speech to the Environmental Horizons 2002 Conference, University of Illinois at Champagne-Urbana, April 1, 2002.
- 9 For a more complete analysis of the environment as a voting issue, see my "Fading Green," *Environmental Policy Outlook*, No. 5 (Washington, D.C.: American Enterprise Institute, December 2002), available at www.aei.org/epo/epo14704.htm.
- 10 See Eric Pianin, "Greenhouse Gases Decrease: Experts Cite U.S. Economic Decline, Warm Winter," *Washington Post*, December 21, 2002, p. A-2.
- 11 Pierre Lepetit and Laurent Viguier, *The United States and Climate Change* (Paris: French Center on the United States, July 2002), pp. 14-15.
- 12 *Ibid.*, p. 30.
- 13 Thomas C. Schelling, "What Makes Greenhouse Sense? Time to Rethink the Kyoto Protocol," *Foreign Affairs*, May/June 2002, pp. 2-9.
- 14 Martin I. Hoffert, Ken Caldeira, Gregory Benford, David R. Criswell, Christopher Green, Howard Herzog, Atul K. Jain, Haroon S. Kheshgi, Klaus S. Lackner, John S. Lewis, H. Douglas Lightfoot, Wallace Manheimer, John C. Mankins, Michael E. Mauel, L. John Perkins, Michael E. Schlesinger, Tyler Volk, and Tom M.L. Wigley, "Advanced Technology Paths to Global Climate Stability: Energy for a Greenhouse Planet," *Science*, Vol. 298 (1 November 2002), pp. 981-987.
- 15 For a counterpoint to Easterbrook, Bradsher, and other SUV social critics, see David Brooks, "The Scarlet SUV: Who's Against Sport Utility Vehicles? A Bunch of Geeks," *Wall Street Journal*, January 21, 2003. Brooks, of course, has offered his own moral critique of the stylings of affluent baby boomers in *Bobos in Paradise: The New Upper Class and How They Got There* (Simon & Schuster, 2000).
- 16 Greg Schneider, "Cute vs. Brute: Detroit Is Racing to Catch Up With Smaller, More Stylish Foreign SUVs," *Washington Post*, January 26, 2003, p. H-1.
- 17 January 8, 2003, p. B-1. Just three weeks later, the front page of the *Journal* returned to the theme, with a feature column headlined: "Auto Makers Start to Back Away from Big SUVs," January 27, 2003, p. A-1.
- 18 One of the most ambitious current efforts to showcase fuel cell development is the California Fuel Cell Partnership, whose work can be seen at www.cafcp.org.
- 19 *PNAS Early Edition*, May 2002 (available at www.pnas.org/cgi/doi/10.1073/pnas.14203334699);
- 20 Available at www.panda.org/livingplanet/lpro2/downloads.cfm.
- 21 "Sensitivity analysis reveals the range of possible outcomes by changes in our assumptions," says Wackernagel, *et al.*, p. 3.
- 22 These studies implicitly acknowledge this point. The WWF version of the study includes a projection allowing for unspecified "accelerated technological change" that shows a reversal of the upward sloping trend of the human ecological footprint, which is consistent with the dynamic understanding of sustainability outlined here.
- 23 Nico Keilman, "The threat of small households," *Nature*, 421, 30 January 2003, pp. 489-490; Jianguo Liu, Gretchen C. Daily, Paul R. Ehrlich, and Gary W. Luck, "Effects of household dynamics on resource consumption and biodiversity," *Nature*, 421, 30 January 2003, pp. 530-532.
- 24 Antony Trewavas, "Malthus foiled again and again," *Nature*, 418, 8 August 2002, pp. 668-670.
- 25 Susan E. Page, Florian Siegert, John O. Rieley, Hans-Dieter V. Boehm, Adi Jaya, and Suwido Limin, "The amount of carbon released from peat and forest fires in Indonesia during 1997," *Nature*, No. 420, 7 November, 2002, pp. 61-65.
- 26 *The State of the Nation's Ecosystems* is available in paperback from Cambridge University Press, or online at www.heinzctr.org/ecosystems/.
- 27 Charles F. Bostwick, "Species Losing Race for Survival," *Los Angeles Daily News*, January 5, 2003, p. 1.
- 28 David Arnold, "Test said to show fish undercount," *Boston Globe*, September 29, 2002, p. B-3.
- 29 Mike Taugher, "Delta's hospitality to smelt pays off as numbers surge," *Contra Costa Times*, October 9, 2002.
- 30 Andrew C. Revkin, "How Endangered a Species?", *New York Times*, February 12, 2002.

MEDIA ROUNDUP: THE INK IS BLACK BUT THE NEWS IS GREEN



ainstream environmental reporting is becoming more accurate and more positive. Of course, the “doom-and-gloom” mentality is still prevalent, environmental articles typically fail to get the basic facts straight, and news stories often uncritically convey the sensational claims of advocacy groups. Yet the past year offers some outstanding examples of sound reporting. So this report offers a “top 10” list of the best news features and editorial analysis of the past year.

During the slow news days of the Christmas season, the story that a cult of UFO nuts had cloned a baby (later changed to two babies) dominated print and broadcast media. It was an obvious hoax, and yet practically the first large-circulation publication to say so was the *National Enquirer*, which usually promotes rather than debunks hoaxes. How, some media watchers asked, could a story with no evidence, coming from a dubious source, have received such prominent mainstream news coverage?

News executives and editors constantly argue that they serve as “filters” of news for the public, yet the coverage of the Raelian cloned-baby hoax suggests the only filters employed in most newsrooms are in the coffee makers. We would suggest that media filters for environmental news are similarly porous. A good example comes from the corrections page of the *New York Times*, which, *Times* readers will attest, has become essential reading on a daily basis.

While the *Times*’ corrections section has been growing in size and frequency, few entries can top this one from December 15: “An article on Nov. 10 about animal rights referred erroneously to an island in the Indian Ocean and to events there involving goats and endangered giant sea sparrows that could possibly lead to the killing of goats by environmental groups. Wrightson Island does not exist; both the island and the events are hypothetical figments from a book (also mentioned in the article), *Beginning Again*, by David

Ehrenfeld. No giant sea sparrow is known to be endangered by the eating habits of goats.”

The issue of media inaccuracies, fads, and the pack mentality that produces homogeneous coverage is not new or unique to environmental coverage, but the problem may be more severe on the environment than other topics for a variety of reasons. Environmental issues combine complicated questions of earth science along with the arcana of bureaucratic regulation, which offers two paths for news writers to go wrong. Even when a reporter has some background in earth science or regulatory law, it is extremely difficult to convey the full dimensions of an environmental issue to a general reader in the compass of an average newspaper or broadcast story. The problem of environmental reporting is also aggravated by the politics of the issue.

Environmental advocacy organizations enjoy great moral authority with the media and the public because of their self-identification as “public interest” bodies, while industry (alternatively known as “the regulated community”) is viewed with suspicion because of its self-interested profit motive. This tends to produce asymmetry in news coverage, with the claims of environmental advocacy organizations accepted at face value while industry claims are often given an overlay of the amount of campaign contributions an industry has given to office holders (especially President Bush).

It is certainly correct to point out industry self-interest and how different interests congeal around the two political parties, but environmental advocacy organizations should receive commensurate analysis. Some environmental advocacy organizations such as the Sierra Club and the League of Conservation Voters make considerable campaign contributions and efforts of their own in election seasons—overwhelmingly on behalf of Democrats.

It needs to be recognized that an ideological agenda can be just as perverse as a self-interested agenda. In some cases, self-interest may be in play as much as ideology. Many environmental organizations receive

“CAN YOU REMEMBER A DAY WHEN YOU OPENED YOUR MORNING NEWSPAPER WITHOUT FINDING A DRAMATIC AND DISTURBING STORY ABOUT SOME ENVIRONMENTAL CRISIS THAT’S EITHER HERE OR LURKS JUST AROUND THE CORNER? THAT WOULD BE A RARE DAY.”

JACK M. HOLLANDER

THE REAL ENVIRONMENTAL CRISIS

large grants from the EPA and would have to cut programs and staff if their grants were curtailed. Changes in policy, let alone administrative personnel under a different president, have a significant effect on environmental groups' financial self-interest. Yet reporters seldom, if ever, ask environmental groups about their funding sources.

Environmental news stories often uncritically convey the sensational claims of advocacy groups. A good example is the news coverage of the annual air quality report from the American Lung Association (ALA), which features identical failing grades of air quality for many areas of the nation with widely varying conditions, based on a questionable methodology that is never explained in the news copy.¹ The news stories typically fail to point out that air quality in most locations has improved substantially in the last 10 years. The notable exception to this in 2002 was Associated Press reporter H. Josef Hebert, whose story made a point of noting that air quality is vastly improved.

The U.S. Public Interest Research Group (USPIRG) releases its own study ("Danger in the Air") each year, a month after the Lung Association, that uses an identical methodology. Yet the media never seems to notice it is the same study as the ALA. It produces a second round of identical stories about worsening smog that are little more than rewrites of the USPIRG's press release.

Another genre of superficial environmental reporting is a variation of the old practice known as "ventriloquist journalism," wherein a news writer ostensibly reporting the news selects a story set-up and quotations from interested parties to fit a preconceived story line. One of the worst examples of this was Eric Pianin's September 30, 2001 *Washington Post* story, "Deaths Raise Alarm on Power Plants." Pianin's lead could have been borrowed straight from the script of *Erin Brockovich*: "Last fall, two Chicago area high school students died of asthma attacks at school."

What made this news for Pianin was the proximity of the school to two coal-fired power plants. Not until

the sixth paragraph of the story does Pianin report that "Industry officials, researchers, health groups and environmentalists generally agree that it is impossible to directly link an individual's death to pollution or particulate matter from a specific power plant." Yet that is the premise of the entire article.

Often environmental articles don't even have the basic facts straight. A good example is Elizabeth Kolbert's article "Bad Environments" in the May 15, 2002 issue of *The New Yorker*. Among her heated charges against the Bush administration was that "he had scuttled new standards for arsenic in drinking water." In fact, the Bush administration had adopted the new arsenic standard several months previously.

Whatever happened to *The New Yorker's* famous fact-checking process? The Kolbert article also criticized the Bush administration for adopting new regulations of the mining industry that some environmentalists disliked, but failed to note, most likely because she didn't know or check, that the regulations in question were developed during the Clinton administration.

In news coverage of the Bush administration's changes to the "New Source Review" (NSR) rule of the Clean Air Act, a frequent theme has been that the changes would allow industrial facilities to avoid installing pollution-abatement equipment if the facilities were upgraded or expanded. Associated Press reporter John Heilprin's story of November 22, 2002 (headlined "White House Loosens Clean Air Rules") is an excellent example. The lead of the story reads: "The Bush administration on Friday eased clean air rules to allow utilities, refineries and manufacturers to avoid having to install expensive new anti-pollution equipment when they modernize their plants."

This characterization is wrong. Plant changes are only exempt from NSR if there would be no increase in emissions. If the change involved even the possibility of higher emissions, then NSR would still be triggered. (The enormously complicated NSR issue is discussed in greater detail in the air-quality section of this *Index*.)

It is not possible to construct an objective indicator or quantitative index to reflect trends in environmental reporting. (See the related item nearby on the *New York Times*' coverage as a proxy for reporting trends.) It would also be impossible to single out the worst environmental reporting of the year, as the candidates for the dishonor are too numerous.

On the other hand, there were a number of stories published in the last year show an improving trend in appreciation of the tradeoffs, nuance, and counter-intuitive nature of many environmental problems. So here is our "Top 10" list of the best environmental stories of the last year (and several honorable mentions), divided into two categories—news features and editorial analysis.

BEST NEWS FEATURES, 2002

1. *The Economist*, Survey on Sustainable Development, July 6, 2002.

The Economist regularly offers the most balanced editorials and best news coverage of environmental issues of any major media source, and could be awarded first-through-tenth places in a ranking of best environmental journalism. *The Economist's* best story of 2002 was its special survey that demystified the "dangerously slippery concept" (in *The Economist's* words) of sustainable development.

2. *Washington Post* reporter Michael Grunwald.

Grunwald's four-part feature series on the environmental problems of the Florida Everglades ran in the *Post* in June.² In these pieces, he walks carefully through the long background of the Everglades degradation and the multi-billion dollar plan to remediate the historic swamp over the next 20 years. The project's cost may ultimately swell to as much as \$80 billion, making it the most expensive public works project in history. Yet there are many reasons to doubt it will work, and many scientists and environmentalists are now having second thoughts. Grunwald's reporting deserves a Pulitzer Prize.



3. Andrew C. Revkin, *New York Times*, "Biologists Sought a Treaty: Now They Fault It," May 7, 2002.

Revkin, one of the best environmental reporters among the major daily newspapers, recounts how biologists are having second thoughts about the Convention on Biological Diversity, which grew out of the 1992 Earth Summit in Rio.³ A primary purpose of the treaty was preventing the exploitation of biological resources, especially in the tropical latitudes that contain many of the leading biodiversity "hotspots" where a disproportionate amount of rare species exist. In practice the treaty has had the unintended effect of curtailing scientific research on biodiversity in these regions.

As Revkin explained, "the treaty has spawned paralyzing biological bureaucracies built on the widespread belief that any scientist collecting samples—whether for a drug company or a dissertation—is bent on stealing genetic material and making a fortune." Hence scientists find it increasingly difficult to get permission to conduct field research, let alone take samples back to laboratories for cataloguing and further study.

Brazil, for example, has banned the export of leaf samples. This is hindering genuine research into identifying species and devising strategies and priorities for their protection. Meanwhile, the prospect that tropical regions would turn out to be "the medicine chests of the world" has not panned out, with few pharmaceutical breakthroughs coming from rain forest biota.



4. Kirk Johnson, *New York Times*, “You Should Have Seen the Air Back in ‘53: 9/11 and History’s Lessons on Pollution,” September 29, 2002.

The concern over hazardous air quality in lower Manhattan in the aftermath of the September 11 attacks led *Times* reporter Johnson to look back to a time when there was “a six-day siege of air pollution that fouled the region with a ferocity unimaginable by the standards of today’s far cleaner air.” The media seldom carries stories comparing environmental conditions today with those in the past, which is one reason the public has a poor sense of the progress made. “Many people have probably forgotten how bad the good old days really were,” Johnson wrote, “turning back the clock can be a revealing exercise.” Footnote: Johnson recounts how a closer look at the data from lower Manhattan revealed that the trucks idling at Ground Zero waiting to haul away the rubble were responsible for more air pollution than the Trade Center debris.

This was not Johnson’s only story that displayed more depth and range than typical news reports about air pollution. A May 20 story—“A Changing Climate in Ideas About Air Pollution; New Research on Region’s Air Quality Presents a More Complicated Picture”—

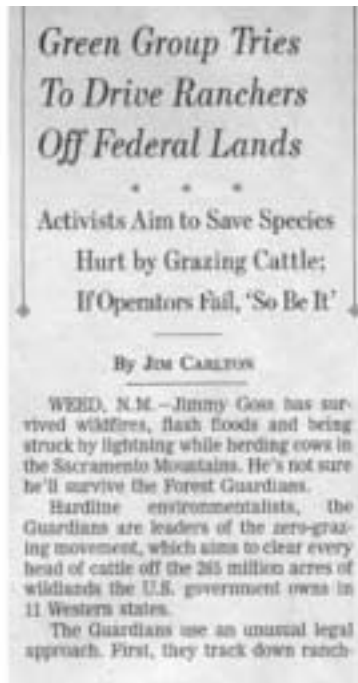


acknowledges again the significant improvements in air quality over the past generation, and explores recent research showing that the nature and sources of air pollution do not fit into the black-and-white-world of industry versus regulators. “[M]any scientists and air quality experts say that more and more, the old patterns and assumptions and lines of responsibility about air quality no longer tell the whole story.”

5. Jim Carlton, *Wall Street Journal*, “Green Group Tries To Drive Ranchers Off Federal Lands,” November 11, 2002; Jon Christensen, *New York Times*, “Environmentalists Hail the Ranchers: Howdy Partners,” September 10, 2002.

This pair of stories illustrates two sources of the ferocity and distrust at the center of western land controversies. The *Journal’s* Carlton explores the coercive tactics of Forest Guardians, an environmental group that targets lawsuits against financially pressed western ranchers with the intent of driving them out of business (and, therefore, off federal land). Environmental groups and their tactics are seldom described in such direct terms: “Hardline environmentalists, the Guardians are leaders of the zero-grazing movement, which aims to clear every head of cattle off the 265 million acres of wildlands the U.S. government owns in 11 western states.”

The *Times’* Christensen, meanwhile, explores the views of the growing number of environmentalists



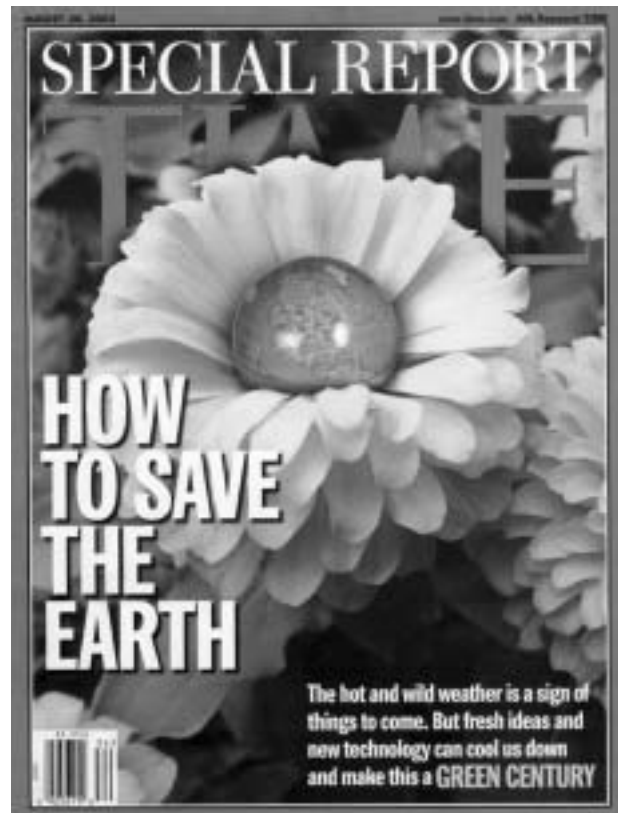
and scientists who “are now saying that cattle ranches may be the last best hope for preserving habitat for many native species.” The future of western ecosystems depends on which faction of environmentalism prevails. Unfortunately, the ones who act through lawyers rather than biologists usually enjoy the upper hand.

HONORABLE MENTION

***Time* magazine, “Green Century: How to Save the Earth,” Special Report, August 26, 2002.**

In past special issues on the environment, *Time* magazine generally threw in its lot with the eco-pessimists, saying in 2000 that “everyone knows the planet is in bad shape... The decline of Earth’s ecosystems has continued unabated.” (“Condition Critical” was *Time*’s headline then.) *Time*’s latest comprehensive look at the world’s prospects represents a subtle but significant shift in tone—perhaps in response to Bjørn Lomborg’s criticism of *Time*’s unmitigated alarmism just three years ago.

“[T]he report is at its root a declaration of optimism,” says *Time* executive editor Adi Ignatius. “Yes,



our planet is under siege from the combined pressures of air and water pollution, global warming and overpopulation. But new technologies, innovative, market-based incentives and a growing mainstream acceptance of green concerns offer hope that real progress is within reach.”

“The globe doesn’t need to be saved by us, and we couldn’t kill it if we tried,” add *Time* reporters Jeffrey Kluger and Andrea Dorfman. And *Time* environmental editor Charles Alexander states: “So much environmental reporting emphasizes only the problems. We wanted to focus on the solutions.” Of special note in the report is Andrew Goldstein’s article criticizing the outlook and tactics of environmental groups, under the title “Too Green for Their Own Good.” Comments Goldstein: “Fuzzy math and scare tactics might help green groups raise money, but when they, abetted by an environmentally friendly media, overplay their hand, it invites scathing critiques...”

Audrey Hudson, *Washington Times*, “Tests Show 8 Metals in River Dumping,” June 4, 2002.

The typical news story follows the line of environmental organizations in focusing on egregious behavior by “corporate polluters.” Hudson’s story appears on the surface to follow the standard story line with its revelation of high levels of arsenic, lead, mercury, chromium, copper, zinc, nickel, and selenium being dumped in the Potomac River near Washington, D.C. The twist to this story, however, is that the dumping party wasn’t a “corporate polluter,” but the federal government’s Army Corps of Engineers—the supposed guardian of wetlands.

Hudson’s follow-up stories reached comic proportions, with the EPA claiming that the discharges help fish by discouraging their capture by fishermen. An EPA document argued that discharge “actually protects the fish in that they are not inclined to bite and get eaten by humans but they go ahead with their upstream movement and egg laying.” (“EPA Says Toxic Sludge Good for Fish,” *Washington Times*, June 19, 2002.) After this story ran, the EPA attempted to shift the blame to the Army Corps for this lame rationale, keeping the story alive for another news cycle. The *Washington Times* was the only media outlet to follow this story.

Andrew Goldstein and Matthew Cooper, *Time* magazine, “How Green Is the White House?” (Subhead: “It’s Greener Than the Environmentalists Admit, But It Still Rolls Out the Red Carpet for Corporations.”) April 29, 2002.

While repeating some of the boilerplate about the Bush administration’s business-friendliness, this *Time* article broke from the superficial categories that typify most news stories. “Bush’s novel, market-driven approaches may prove efficient and effective in ways that environmentalists seem unable to see. And there has been more continuity with the previous White House than either the Clinton-bashing Bush team or the Bush-hating environmentalists like to admit.” About Bush’s air quality policy *Time*’s writers said:

“Bush may be on to something here. Enforcing existing clean air law has become a legal nightmare.” Other environmental controversies are ambiguous and still hard to judge. *Time* is correct about one thing: “The fight never ends.”

Clifford Krauss, *New York Times*, “The War Against the Fur Trade Backfires, Endangering a Way of Life,” February 4, 2003.

As with the story about the unintended consequences of the Convention on Biodiversity, this *Times* story explains the effects of the categorical imperative against the fur trade, which had been a tribal tradition of the indigenous Inuits and other Native Canadian groups.

“The unintended consequences of the war against fur,” Krauss writes, “have hurt the livelihoods of thousands of Canadian Natives, and have enticed them to replace their lost incomes by welcoming into unspoiled areas the oil, gas and mining interests they once opposed. ‘I can’t find the words to fight back,’ said Zacharias Kunuk, an Inuit film director and seal hunter who lives in the Arctic town of Igloolik. ‘They are a bunch of Hollywood rich people who talk as if animals think like humans, when they don’t.’”

Even some environmentalists get it. The executive director of the Canadian Sierra Club admitted, “The collapse of the fur trade was a disaster for the people who are the guardians of the environment.”

Blaine Harden, *New York Times*, “They Brake for Turtles in Padre Island Park,” December 1, 2002.

When Congress created Padre Island National Park on the Texas coast 40 years ago, it included the highly unusual stipulation that oil and gas exploration be allowed to continue in the new park. The sand strip of the park is a favorite breeding ground of Kemp’s ridley sea turtle, an endangered species. And despite new oil and gas exploration and an estimated 800,000 people a year who drive their cars on the beach, the number of Kemp’s ridley sea tur-

tles breeding at Padre Island is increasing. *Times* reporter Blaine Harden summarizes: "Padre Island has consistently defied all-or-nothing arguments about land use, whether from outraged environmentalists or hard-line advocates of energy exploration."

Elizabeth Shogren, *Los Angeles Times*, "Fires Rekindle Campaign to Thin Forests," June 29, 2002.

Shogren's story offered a balanced account of both sides of the forest-thinning controversy.

Send that Rhino a Prescription for Viagra!

The most unlikely "unintended consequence" news story of 2002 concerns the environmental benefits of Viagra. *Viagra and the environment?* Yes. According to a report in the *New York Times Magazine* (December 15, 2002), conservation biologists are noticing a sharp fall-off in demand for aphrodisiacs made from endangered and rare species (Alaskan reindeer antlers, harp seal penises, sea turtles, gecko lizards, and so forth). They have attributed the decline to the availability of Viagra, which actually works. Who knew?

Maybe the Gipper Was Right after All.

Since former President Ronald Reagan's reputation continues to rise, perhaps it is time to re-examine the claim that earned him some of his most severe ridicule: the idea that trees are a source of air pollution. In November the Associated Press reported on an EPA study to ascertain the amount of isoprene (a precursor to formaldehyde) emitted by oak trees in the Ozark forest near St. Louis. The AP report notes: "Trees have been blamed for up to 65 percent of ozone-forming chemicals in Houston." Footnote: St. Louis met the Clean Air Act standard for ozone for the first time last year.

Incentives Matter.

From time to time during the protracted debate about prospective oil and gas exploration in the Alaska



National Wildlife Refuge (ANWR) it is pointed out that because ANWR is a political battle over public land, it is cost-free for environmental groups to oppose all oil and gas production there.

For some years the Audubon Society has allowed oil and gas wells on one of its own wildlife reserves in Louisiana, which certainly suggests that oil and gas production is compatible with habitat production. More examples of how environmental organizations make different decisions when they own the land themselves came to light in 2002 thanks to reporting in the *Los Angeles Times* and the *Washington Post*.

The *Times* reported on August 20 (Janet Wilson, "Wildlife Shares Nest With Profit") about how the Nature Conservancy (TNC) has kept gas wells open on a 2,263-acre oil field in Texas that Mobil donated to TNC back in 1985. (Mobil decided to abandon the field because its modest production had become unprofitable.) In fact, TNC drilled new wells on what it calls a "working landscape." So far TNC has reaped \$5.2 million in revenue from the field.

Separately the *Washington Post* reported in July 25 that the Nature Conservancy had entered into an agreement to log a private landholding in southwestern Virginia (Steven Ginsburg, "Conservancy to Log on Private Land"). In this case TNC isn't even extracting timber from its own land (which it has done on other TNC holdings for a long time); it is going to manage a 5,750-acre timberland owned by Stuart Land & Cattle Company so as to protect watersheds, rare

species, and other sensitive features of the landscape. Through selective logging, TNC sees this unusual step as a way of protecting the integrity of forestlands. Couldn't this be done on some public forestlands, too?

It Was Bound To Happen Sooner or Later...

From the London *Evening Standard* newspaper, February 13, 2003: "Man-Eating Lions Dine on Eco-Tourists." Do we really need to explain this one?

BEST EDITORIAL ARTICLES, 2002

1. "Clearing the Air," *Washington Post* house editorial, April 23, 2002.

While reiterating its disagreement with the direction of Bush administration environmental policy, this *Post* editorial took to task the "distortions" and overheated rhetoric of Bush's environmental critics, including former Vice President Al Gore. Gore had said on Earth Day last year that George Bush "thought that maybe there wasn't enough arsenic in the drinking water... they actually had a proposal to increase the levels that would be permitted."

This is nonsense, as Gore surely knew, which prompted the *Post* to comment: "This kind of distortion doesn't help the debate, nor does the demonizing of industry that seems to be part of the current green pitch... [T]he next set of advances is going to require complex decisions and difficult tradeoffs. We agree that Mr. Bush is leaning the wrong way as he approaches a number of these. But as those decisions are debated, both sides will be better served by rhetoric that stays grounded in reality."

2. "Fighting Malaria with DDT," *New York Times* house editorial, December 23, 2002.

New York Times environmental editorials are about as conventionally and sentimentally green as they come, so it was remarkable to see the *Times* deviate from the environmental party line and endorse the continued use of DDT in parts of the developing world where malaria is still epidemic and where substitutes are

either unaffordable or ineffective. (Malaria kills one of every 20 children in Africa.) The *Times* gently notes the hypocrisy of wealthy western nations who now refuse to provide aid to African nations to eradicate malaria with limited use of DDT. "America used DDT to eradicate malaria, as did southern Europe and India... The developed world has been unconscionably stingy in financing the fight against malaria."

3. Nicholas D. Kristof, "In Praise of Snowmobiles," *New York Times* op-ed column, December 24, 2002.

Environmentalists are in full battle cry against the Bush administration's decision to continue to allow snowmobile use in Yellowstone National Park during the winter. (Snowmobiles have been used in Yellowstone since the early 1960s. The Bush policy will allow only the newer, quieter, and lower polluting four-stroke engine snowmobiles.) Just one day after its DDT editorial, *Times* reporter Kristof defended the Bush policy with some common-sense observations.

"It is pretty clear that without snowmobiles very few Americans will get the thrill of seeing Yellowstone in winter," Kristof argues. "Some environmentalists have forgotten, I think, that our aim should be not just to preserve nature for its own sake but to give Americans a chance to enjoy the outdoors." Kristof notes that the proposed alternative—snow coaches, or "buses on treads"—are not very effective, and probably emit more air pollution than four-stroke snowmobiles. Moreover, research suggests that cross-country skiers have a more adverse impact on native animals in Yellowstone than snowmobiles do.⁴

4. "Green Blues," *The New Republic* house editorial, May 6, 2002.

Like the *Washington Post* in item 1 above, *The New Republic* (which endorsed Al Gore for president in 2000) finds "plenty to dislike in George W. Bush's environmental record," but argues that "the popular notion that the Bush administration has launched a wide-ranging assault on environmental regulation is

simply wrong... [R]eflexive bashing of Bush's environmental policies is not only dishonest; it may actually hamper further environmental progress... [T]he green lobby and their Democratic allies put environmental demagoguery before environmental progress."

5. James S. Shikwati, "Ivory and Eco-Imperialists," *Washington Post* op-ed column, November 10, 2002.

Shikwati, director of the Inter-Region Economic Network in Kenya, argues the counter-intuitive case that relaxing the international ban on the ivory trade would serve the interest of protecting elephants. "The continued ban on ivory trade and the barricading of animals will only undermine long-run elephant survival and will do little to enrich impoverished Kenyans," Shikwati wrote. "Kenyans and other Africans do not need development aid to develop. What they do need is the ability to make use of their resources—even elephants—without the interference of elitist eco-imperialists."

Five African nations asked for modifications to the ivory trading ban at an October 2002 conference of the Convention on International Trade in Endangered Species.

HONORABLE MENTION

Andrew Kenny, "Prepare for the Big Chill," *The Spectator*, 22 June 2002.

There are few media outlets willing to give prominent coverage to climate-change skeptics, so it was notable when *The Spectator* of London devoted its cover to Andrew Kenny's spirited and lengthy frontal attack on the global-warming hypothesis. Kenny wonders whatever happened to the seemingly well-founded worry 25 years ago that the major climate-change threat facing the planet was a new ice age, whose effects would be much worse than a warming climate. Kenny also decries the lack of seriousness among climate alarmists; real concern about near-term CO₂ emissions should lead them to embrace nuclear power. But that's an even

greater heresy than questioning the global-warming hypothesis.

Gregg Easterbrook, "Everything You Know about the Bush Environmental Record is Wrong," AEI-Brookings Joint Center for Regulatory Studies, Working Paper 02-6 (April 2002); "Air Condition: Bush, Pollution, and Hysteria," *The New Republic*, July 1, 2002.

Having mildly demurred on Easterbrook's *New Republic* article attacking SUVs (see Introduction), fairness requires that we note his other journalism that departs from the conventional wisdom. For AEI-Brookings, Easterbrook asks: "[A]ctual instances of Bush anti-environmental policies are few, while the new president has received no credit for significant actions to reduce air pollution. What's the political and media dynamic that makes everyone feel so sure that Bush is anti-environment?" In *The New Republic* Easterbrook advises everyone to *calm down* about the Bush changes to new source review (see the air quality section of this report for background on this issue), and praises the emissions trading idea of Bush's proposed "Clean Skies" initiative. Easterbrook notes of the NSR controversy: "environmentalists and some Democrats are drastically, perhaps even deceitfully, exaggerating NSR's benefit while industry lobbyists and some Republicans are drastically, perhaps even deceitfully, exaggerating its harm. It's a case study in how, in contemporary Washington, the media, lobbyists, enviros, and both parties bring out the worst in each other."

TILTING AT WINDMILLS

Some of the best environmental news coverage of 2002 concerned the local controversies about proposed wind-power installations. Since we no longer build new hydroelectric facilities (the only other source of emission-free electricity except for the kind that begins with the n-word), advocates of renewable energy sources have hoped that wind power could provide as much as 20 percent of the nation's electricity by the year 2020 (currently wind power provides only about one percent of the nation's electricity). They have also hoped that federal subsidies, such as favorable depreciation tax treatment, would make wind power facilities attractive to investors.

More than 20 major wind power installations have been proposed for wind-rich areas of the East Coast, promising several thousand megawatts of power and reducing emissions of air pollutants by several million tons a year. However, most of these projects have run into opposition from environmentalists. This turnabout—might we call it hypocrisy?—received prominent media coverage.

Brian Stempeck of *Energy and Environment Daily* offered a partial roster of wind-power projects delayed or cancelled because of environmentalist opposition:

- Two projects in Nevada, including one at the unpopulated Nevada Test Site, have been delayed while wildlife impacts are studied;
- A 28-turbine facility planned for Addison, Wisconsin has been scrapped due to local opposition;
- The Appalachian Trail Conference is opposing a proposed 29-turbine wind farm in Redington, Maine;
- Local environmental groups in Kittitas County, Washington are opposing a proposed 150-turbine wind farm;
- The Sierra Club is opposing a 47-turbine wind farm planned for Waymart, Pennsylvania;

- A proposed wind farm in West Virginia—coal country—is facing environmental opposition;
- Ditto for a 43-turbine project near Albany, New York;
- Ditto for a proposed project on the Tennessee/North Carolina border; and
- Ditto for a wind farm offshore near Chesapeake, Virginia.

But the wind project that garnered the most publicity was Cape Wind Associates' proposal to build a \$700 million, 170-turbine project in the coastal waters of Nantucket Sound near Martha's Vineyard. What was Cape Wind thinking? *Martha's Vineyard*?

"Not in My Back Bay" read the headline in *Time* magazine's account of the controversy. (Fox News and the Associated Press also ran stories on the Cape Cod wind farm story.) *Time* thinks the denizens of the Cape are being churlish: "With tensions rising in the Middle East and war looming in Iraq, there are worse things to lose than an unspoiled ocean view." Fox News broadcast a similar story playing up the NIMBY (not in my backyard) angle.

"We wouldn't build a wind farm in the middle of Yosemite," said environmentalist Robert F. Kennedy, Jr., who is opposing the project.⁵ The famed Kennedy compound in Hyannisport looks out at the proposed site of the wind farm.

To be sure, the Cape Wind Associates project would spread windmills taller than the Statue of Liberty over a 28-square-mile area. Although the project could supply electricity (as long as the wind is blowing) to half the homes on Cape Cod, the massive area required for a relatively small amount of power production demonstrates the limitations of wind power given the political resistance it is likely to encounter at many locations. Wind power generation requires about two square miles per megawatt. The comparison with a conventional power plant is

jarring; while a 1,000-megawatt wind power facility would require about 2,000 square miles of land or sea surface area, a conventional 1,000 megawatt power plant needs only about 20 acres.

A Union of Concerned Scientists spokesman told *Time* magazine that "there is no energy source today with zero impact." Translation: Some environmentalists (why is it always the noisiest ones?) now feel just fine about opposing wind power, too. In addition to public opposition to wind farms, small-scale wind-power installations can face significant local regulatory barriers.

Los Angeles Times reporter Nancy Rivera Brooks filed a story on February 11 detailing the difficulty of installing a single windmill for home power use: "[G]etting a home windmill up and running in Los Angeles County is anything but a breeze... Los Angeles County calls for special fencing, lights, bonding and studies that can add thousands of dollars and months of delay to the windmill approval process."



IS ENVIRONMENTAL COVERAGE INCREASING?

Since the *New York Times* is regarded as the agenda-setter for journalism in the United States, we decided to examine the *Times* to see whether reporting on environmental issues is on the upswing. Clemson University's Bruce Yandle devised a rough method of quantifying the amount of environmental news coverage in the pages of the *New York Times* by taking the percentage of pages devoted to environmental stories times 1,000.⁶ Yandle tracked *Times* coverage of air pollution and water pollution from 1954 through 1986; we have updated his series through 2000, displayed in Table 1.

Table 1 shows that stories about air and water pollution zoomed around the time of the first Earth Day in 1970, ebbed, and then increased again in the late 1980s and early 1990s.

TABLE ONE:
INDEX OF NEW YORK TIMES COVERAGE OF AIR
AND WATER POLLUTION


Year	Water Pollution	Air Pollution
1954	0.26	0.54
1956	0.17	0.35
1958	0.48	0.48
1960	0.44	0.59
1962	0.70	0.47
1964	1.05	0.56
1966	1.42	1.42
1968	1.36	1.17
1970	7.60	5.55
1972	4.83	3.38
1974	2.91	2.59
1976	4.55	2.50
1978	2.28	1.39
1980	2.54	1.97
1982	2.25	1.63
1984	1.85	0.97
1986	1.57	1.49
1988	4.65	1.63
1990	4.03	2.27
1992	1.46	2.68
1994	2.08	1.69
1996	1.39	1.26
1998	1.55	1.16
2000	2.16	2.16

source: *Tracking the Unicorn* and author's calculations

NOTES

- 1 Air quality scientist Joel Schwartz offers an analysis and critique of the Lung Association study at: <http://www.washtimes.com/commentary/20020913-8667252.htm>.
- 2 The stories were: "A Rescue Plan, Bold and Uncertain; Scientists, Federal Officials Question Project's Benefits for Ailing Ecosystem," June 23; "Between a Rock and a Hard Place; Wetlands Shrink Before Growing Demands of Industry, Consumers," June 24; "Growing Pains in Southwest Fla.; More Development Pushes Everglades to the Edge," June 25; "An Environmental Reversal of Fortune; The Kissimmee's Revival Could Provide Lessons for Restoring the Everglades," June 26.
- 3 Although President Bill Clinton signed the convention, the Senate never ratified it.
- 4 Several graduate students at Montana State University have looked into this issue. Some of their work includes: K.E. Aune, "Impacts of Winter Recreationists on Wildlife in a Portion of Yellowstone National Park, Wyoming," unpublished master's thesis, Montana State University, 1981; E.F. Cassier, "Responses of Elk to Disturbance by Cross-country skier in Northern Yellowstone National Park," unpublished master's thesis, Montana State University, 1990; E.F. Cassier, D.J. Freddy, and E.D. Ables, "Elk Responses to Disturbance by Cross-country Skiers in Yellowstone National Park," *Wildlife Society Bulletin* 20, pp. 375-381, 1992; R.A. MacArthur, V. Geist, and R.H. Johnston, "Cardiac and Behavioral Responses of Mountain Sheep to Human Disturbance," *Journal of Wildlife Management* 46, pp. 351-358, 1982; R.D. Shultz and J.A. Bailey, "Responses of National Park Elk to Human Activity," *Journal of Wildlife Management* 42(1): pp. 91-100, 1978.
- 5 This is not the most self-evidently stupid thing Kennedy said last year. On April 6, the *Des Moines Register* quoted Robert F. Kennedy, Jr. as saying "large-scale hog producers are a greater threat to the United States and U.S. democracy than Osama bin Laden and his terrorist network."
- 6 See Bruce Yandle, *Tracking the Unicorn: The Political Limits of Environmental Regulation* (New York: Quorum Books, 1989).

AIR QUALITY

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As recent policy debates indicate, air quality is one of the most controversial environmental topics. However, data on the six pollutants regulated under the Clean Air Act show that air quality is probably the greatest environmental success story of the last generation. The number of days in “exceedence” of the EPA’s air quality standards has declined nearly 50 percent over the last decade, with a 60-percent drop in California alone. This section explains why the trend will continue, with even greater improvements in air quality over the next decade.

INTRODUCTION

Air quality has become the most controversial environmental topic over the last year, with several states suing the Bush administration over its air pollution policy, and environmental groups charging that changes in the complex “New Source Review” program of the Clean Air Act represents a “rollback” for air quality. This spectacle presents a paradox, as the improvement in air quality in the United States is probably the single greatest environmental policy success story of the last generation. Moreover, the improvement in air quality is certain to continue over the next decade, as we shall explain in due course; the argument is almost wholly about technique rather than result. Of course, no one should be shocked—*shocked*—that the ruckus over air pollution is politicized.

Because the improvement in air quality comes in small increments—one to three percent a year—at any given moment the improvement tends to go unnoticed and unappreciated. Polls consistently find that Americans believe that air quality has gotten worse and will continue to get worse in the future. It is only when the entire record of the last three decades is surveyed that the dramatic progress becomes evident.

The EPA’s preliminary report on air quality for the year 2001 notes that since 1970, aggregate emissions of the six criteria pollutants declined 25 percent, at the same time that the U.S. economy grew 161 percent, auto travel increased by 149 percent, and total U.S. energy consumption (the primary source of air pollution emissions) increased 42 percent. While aggregate *emissions* of the “precursors” of pollution have fallen by 25 percent, *ambient* levels of pollution—the actual concentration of pollution in the air that we breathe—have fallen more. (*Ambient* levels of pollution do not match up one-to-one with *emissions* for a variety of meteorological factors.)

SINCE 1970, AGGREGATE EMISSIONS OF THE SIX CRITERIA POLLUTANTS DECLINED 25 PERCENT.

TABLE ONE: AMBIENT AIR POLLUTION LEVELS IN THE U.S.

	1976–2001	2001
Ozone	-32.9%	2.0%
Sulfur Dioxides	-67.0%	-2.9%
Nitrogen Dioxide	-41.7%	-0.6%
Carbon Monoxide	-73.0%	-4.4%
Particulates (PM10)*	-27.0%	-1.2%
Lead	-97.0%	12.5%

*1998–2001

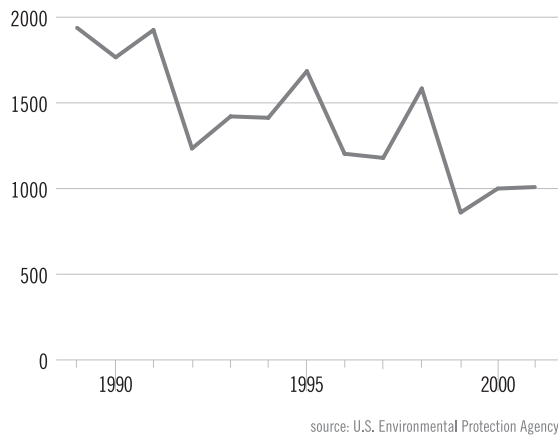
As is our regular practice, we update every year in Table I the average ambient levels for the six pollutants regulated under the Clean Air Act stretching back to 1976 (when more comprehensive national monitoring was finally in place), and the change in pollutant levels for the most recent year for which data are available.¹ The EPA is behind in producing its complete report on air quality trends; complete data are only available through the year 2000, though partial data for the year 2001 allow us to make a preliminary estimate of trends for that year.

A word should be said about the 12.5 percent increase in ambient lead indicated in Table I. The level of lead has fallen so low that a tiny increase, which could easily be a statistically insignificant sampling error or rounding variation, will yield a large percentage gain for a one-year period. Lead *emissions* in 2001 show a decline.

The year 1999 recorded the lowest air-pollution levels since comprehensive monitoring began in the 1970s, in large part because of cooler than average summer temperatures in several smog-prone regions. The summers of 2000 and 2001, on the other hand, returned to normal weather and temperature patterns, while 2002 appears to have been hotter than normal, with early data indicating that smog levels in several areas, such as California’s central valley, increased.²

One way of viewing this progress is to note the decline in the total number of “exceedences” of the EPA’s Air Quality Index (AQI) threshold for “unhealthful” air in

FIGURE ONE: TOTAL EXCEEDENCES OF THE AQI, 94 METRO AREAS, 1989–2001



the 94 metropolitan areas that the EPA monitors, shown in Figure 1. Ozone is heavily weighted in the AQI, and most of the exceedences of the AQI are driven by high ozone levels. As such, the AQI is a good proxy for seeing how the *peak* ozone levels have continued to decline even though average national ozone levels have remained largely flat over the last decade.

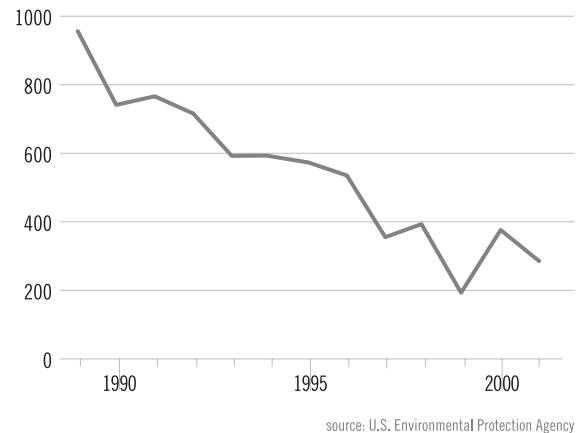
As Figure 1 shows, the total number of exceedences of the AQI unhealthy threshold declined nearly 50 percent over the last decade. In California, the number of AQI exceedences fell by 60 percent, shown in Figure 2. California shows a more consistent improving trend than the nation as a whole. Of the 20 cities with the largest gains in air quality over the last two decades, the top five are in southern California.

WHAT THE TRENDS MEAN TO YOU

Aggregate national trends do not answer the common-sense question on the mind of most citizens: What does it all mean for human health? Is my local air healthy to

THE TOTAL NUMBER OF EXCEEDENCES OF THE AQI UNHEALTHFUL THRESHOLD DECLINED NEARLY 50 PERCENT OVER THE LAST DECADE.

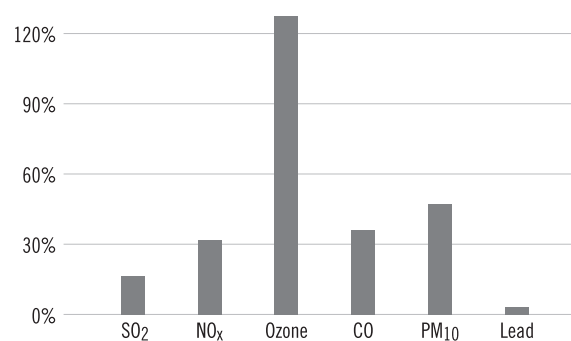
FIGURE TWO: AQI EXCEEDENCES IN CALIFORNIA, 1989–2001



breathe? Nationwide averages mask considerable local variation, and many metropolitan areas of the country remain “non-attainment” areas for one or more pollutants. You can check out your local area on the Internet—the EPA has been publishing state and metropolitan area data since 1985, most of which are now available online at www.epa.gov/air/data/index.html. (Local area data on this site can even be sorted by zip code.)

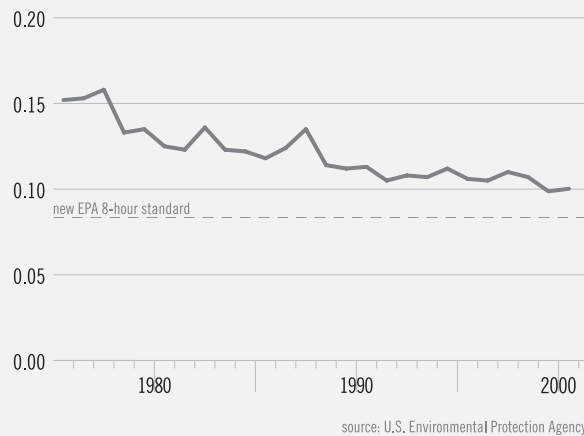
One way of putting the national trends in perspective is to express the average ambient levels as a fraction of the health threshold the EPA sets for each pollutant. As Figure 3 shows, the average levels for five of the six pollutants are far below the EPA’s health-based benchmark; only average ozone still exceeds the EPA’s target.

FIGURE THREE: AIR POLLUTANT LEVELS AS PERCENTAGE OF HEALTH-BASED THRESHOLD



source: U.S. Environmental Protection Agency and author’s calculations

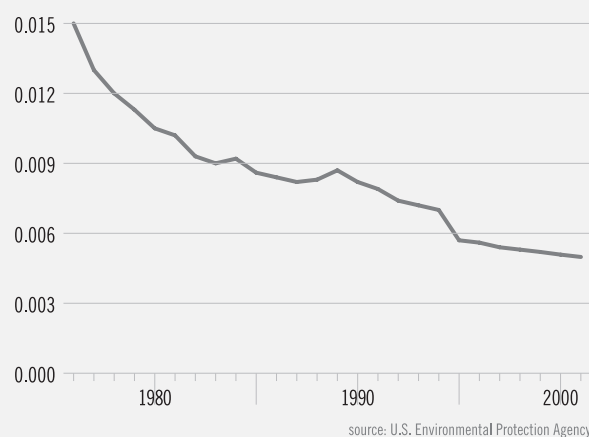
THE POLLUTANTS AND THEIR TRENDS

FIGURE FOUR: AMBIENT OZONE, 1976–2001
(ARITHMETIC MEAN, 2ND MAX 1-HOUR)**OZONE**

Preliminary data indicate that the national average ambient ozone level increased about two percent in 2001 (after experiencing a six percent one year decline in 2000); this represents an upward blip—probably more weather- than emission-related—within a long-term trend that has seen ambient ozone decline by nearly 33 percent since 1976.

SULFUR DIOXIDE

The national ambient sulfur dioxide (SO₂) level fell 2.9 percent in 2001, and has fallen 67 percent

FIGURE FIVE: AMBIENT SULPHUR DIOXIDE, 1976–2001
(ARITHMETIC MEAN)

since 1976. The case of SO₂ illustrates the variable relationship between *emissions* (i.e., the amount of a pollutant coming out of a smokestack or tailpipe) and *ambient* air quality (i.e., the concentration of a pollutant once fully dispersed into the air), and how emissions reductions are leveraged. Between 1980 and 1999, the EPA notes, SO₂ *emissions* fell 27 percent, but *ambient* levels of SO₂ fell by 50 percent.

NITROGEN OXIDES (NO_x)

The ambient level of nitrogen dioxide (the most prevalent form of NO_x) has declined 41.7 percent since 1976, as shown in Figure 6. This decline has occurred even though NO_x emissions have been flat or even rising in a few areas.

The decline of ambient levels of NO₂ in the face of rising NO_x emissions reflects the fact that, as the EPA explains, “nitrogen chemistry in the atmosphere is non-linear and, therefore, a change in NO_x emissions may not have a proportional change in ambient concentrations of NO₂.”

The reasons for the disjunction between emissions and ambient levels are still somewhat mysterious, and the EPA thinks measurement error could be a factor, as well as rapid airborne chemical react-

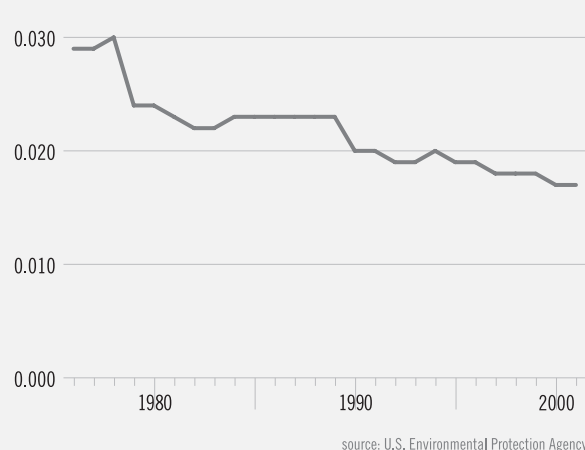
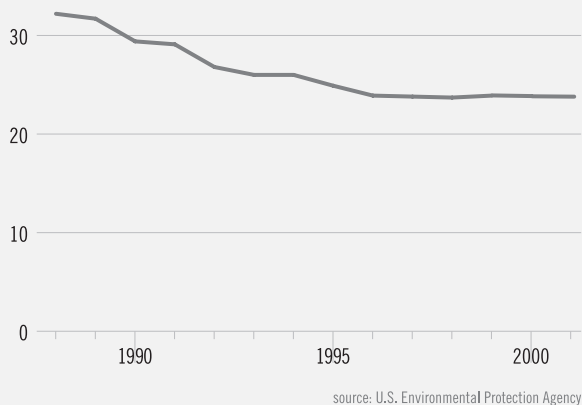
FIGURE SIX: AMBIENT NITROGEN OXIDES, 1976–2001
(ARITHMETIC MEAN)

FIGURE SEVEN: AMBIENT PARTICULATES, 1988–2001 (ANNUAL ARITHMETIC MEAN)



tions. “For example,” the EPA speculates, “an area could experience improving NO₂ air quality in conjunction with increased NO_x emissions, if the emissions are rapidly converted to nitrates, a form of atmospheric nitrogen not detected by the NO₂ monitors. Alternatively, if levels of the compounds which react with NO_x emissions to form ambient NO₂ are declining, increased NO_x emissions may not translate into elevated levels of converted NO₂.”

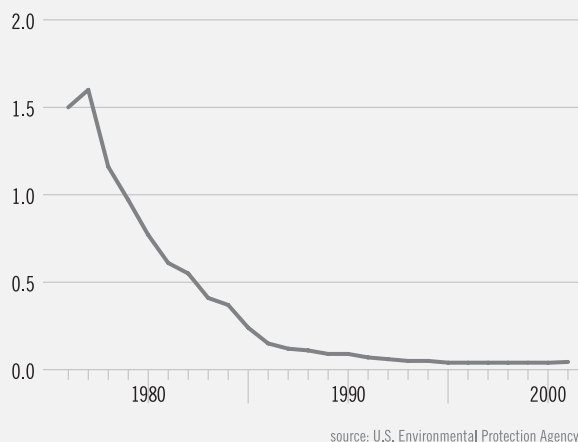
PARTICULATES (PM₁₀/PM_{2.5})

The national average ambient level of particulates 10 microns in size (PM₁₀) has declined by 27 percent since 1988 (when a new measurement network went into effect), and by about one percent in 2001. The EPA is starting to implement a new particulate standard of 2.5 microns, and has begun monitoring for the new standard.

LEAD

The decline in the ambient level of airborne lead is the single greatest success story of air quality in the U.S. Ambient lead levels have fallen steeply and rapidly—97 percent since 1976 (see Figure 8).

FIGURE EIGHT: AMBIENT LEAD TREND, 1976–2001



The principal measure generating this reduction was the phase-out of leaded gasoline, much of which occurred under rules and regulations promulgated by the Reagan administration, seldom given any credit for environmental progress. Airborne lead emissions from a handful of stationary sources (chiefly metal smelters) remain a problem in a few isolated locations. Lead paint in older housing stock, especially in eastern cities, also remains a health risk, but as a general matter American children no longer face significant health risks from airborne lead.

A GUIDE TO AIR POLLUTANTS AND THEIR SOURCES

OZONE

Ground-level ozone is the primary contributor to urban smog, although sulfur, nitrogen, carbon, and fine particulate matter contribute to smog's formation as well. Ozone is not emitted directly into the air but forms when volatile organic compounds (VOCs) combine in sunlight with various nitrogen oxides (NOx), dependent upon weather-related factors. This makes it difficult to predict changes in ozone levels accurately due to reductions in VOCs and NOx. VOCs evaporate into the atmosphere from motor vehicles, chemical plants, refineries, factories, consumer and commercial products such as lighter fluid, perfume, and other industrial sources. VOCs also occur naturally as a result of photosynthesis.

The December 1991 National Academy of Sciences report on ozone revealed that much of the variation in ozone comes from "natural fluctuations in the weather," not from "year-to-year changes in emissions." Therefore, it concluded that current ozone reduction strategies may be ineffective because they do not account for naturally occurring VOCs.

SULFUR DIOXIDE

Sulfur dioxide (SO₂) is a colorless gas that forms from the burning of fuel containing sulfur, mainly coal and oil, as well as from industrial and manufacturing processes, particularly the generation of electrical power. Environmental factors such as temperature inversion, wind speed, and wind concentration also affect SO₂ levels.

NITROGEN OXIDES

Nitrogen oxides (NOx) form naturally when nitrogen and oxygen combine through bacterial action in soil, lightning, volcanic activity, and forest fires. Nitrogen oxides also result from human activities including high-temperature combustion of fossil

fuels by automobiles, power plants, industry, and the use of home heaters and gas stoves. Environmental agencies particularly track the light brown gas nitrogen dioxide (NO₂) because in combination with volatile organic compounds (VOCs) in the presence of sunlight it helps form ground-level ozone.

PARTICULATES

Particulate matter is the general term for a mixture of solid particles, including pieces of dust, soot, dirt, ash, smoke, and liquid droplets or vapor, directly emitted into the air, where it is suspended for long periods of time. Particulates can affect breathing, damage paints, and reduce visibility. These particles derive from stationary, mobile, and natural sources. Such sources include forest fires and volcanic ash; emissions from power plants, motor vehicles, wood stoves, and waste incineration; and dust from mining, paved and unpaved roads, and wind erosion. Indeed, the highest PM₁₀ level in the nation, in Inyo County, California, is caused not by man-made sources, but from wind-blown dust from a dry lake bed.

LEAD

Lead is a soft, dense, bluish-gray metal used in piping, batteries, weights, gunshot, and crystal. Of the six criteria pollutants, lead is the most toxic. When ingested through food, water, soil, or dust, or inhaled through the air, lead can accumulate in the body's tissues and is not readily excreted. Excessive exposure to lead can cause anemia, kidney disease, reproductive disorders, and neurological impairments such as seizures, mental retardation, and behavioral disorders.

CARBON MONOXIDE

When fuel and other substances containing carbon burn without sufficient oxygen, they produce car-

bon monoxide (CO), a colorless, odorless, and at high levels, poisonous gas. Although trace amounts of CO occur naturally in the atmosphere, transportation sources account for 79 percent of the nation's total emissions. In cities, automobile exhaust may be responsible for as much as 95 percent of all CO emissions. Industrial processes, non-transportation fuel combustion, and natural sources such as wildfires are other sources of CO emissions.

ASTHMA UPDATE

Last year we examined the growing concern about the link between air pollution and asthma, noting that the rising trend in asthma among children does not match up in a simple cause-and-effect correlation with falling ozone levels, as shown in Figure 9 below.

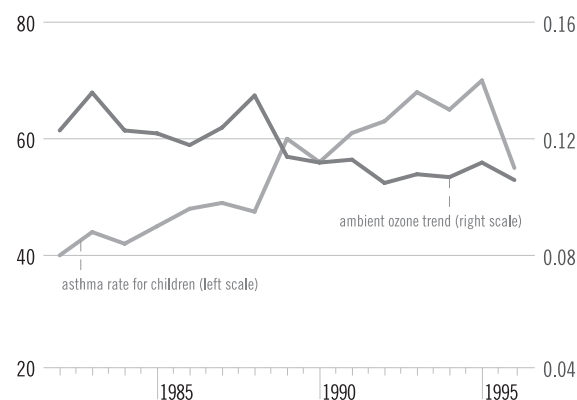
The mystery deepens when surveying the results of the International Study of Asthma and Allergies in Childhood (ISAAC), a 155-nation study.³ As Figure 10 shows, the incidence of asthma symptoms exists in inverse proportion to the severity of air pollution. Mexico, China, and India—nations with vastly higher

levels of air pollution than the U.S. and U.K.—have low rates of asthma, while nations with low levels of air pollution such as Ireland, New Zealand, and Australia have asthma rates six to seven times higher.

These counter-intuitive data have led Prof. Adrian Bauman of the University of New South Wales's School of Community Medicine to write:

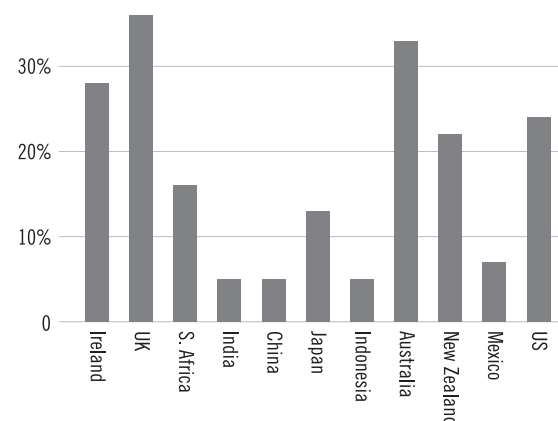
One of the most interesting findings from the ISAAC study is that the international pattern of prevalence cannot be completely explained by our current knowledge of recognized risk factors for the development of asthma. Contrary to popular belief, the global patterns of asthma prevalence provide evidence that air pollution is not a major risk factor for the development of asthma, rather, it is merely a minor trigger in some individuals. For example, some regions in China and Eastern Europe with high levels of air pollution have generally low rates of asthma prevalence. Conversely, some regions with the lowest rates of air pollution such as

FIGURE NINE: CHILDHOOD ASTHMA RATES AND AMBIENT OZONE



source: Centers for Disease Control, National Center for Health Statistics, Estimates from the National Health Interview Survey, Vital Health Statistics - series 10, U.S. Environmental Protection Agency

FIGURE TEN: PERCENT OF POPULATION EXHIBITING ASTHMA SYMPTOMS



source: International Study of Asthma and Allergies in Childhood

parts of New Zealand have high rates of asthma. Overall, it would appear that outdoor air pollution is more likely to be a trigger factor in older people with respiratory conditions other than asthma.⁴

CLEARER SKIES AHEAD?

While progress on reducing ambient levels of ozone has slowed over the last decade, there are numerous reasons to conclude that major air-quality improvements are nearly certain to be achieved over the next decade.⁵ A major reason for anticipating this trend is simple turnover of the auto fleet to newer vehicles with vastly lower emission rates than older cars and trucks. This even includes SUVs.

A useful piece of research on this subject comes from a study for the Society of Automotive Engineers by four air-quality scholars in California.⁶ The Bay Area Air Quality Management District and the University of California at Berkeley have been taking measurements of automobile exhausts from the Caldecott tunnel through the Oakland hills in the East Bay, where more than 4,000 cars an hour pass during peak commuting hours. (Because of the Caldecott tunnel's length and the steady flow of cars that doesn't fluctuate from year to year, it is ideal for generating consistent readings of tailpipe emissions.)

The study found that between 1994 and 2001, carbon monoxide emissions declined 62 percent, nitrogen oxides fell 49 percent, non-methane organic compounds (ozone precursors) fell 67 percent, and ben-

zene fell 82 percent. These declines occurred even though the number of SUVs passing through the tunnel increased from 31 percent of all autos in 1994 to 38 percent in 2001.

The study's authors conclude: "Fleet turnover appears to have had a greater overall impact on emissions than fuel changes for most pollutants. *The reduction in emissions due to replacement of old vehicles with less polluting new vehicles is expected to continue.*" [Emphasis added.]

NEW SOURCE REVIEW—AN OLD SOURCE OF CONTROVERSY

The leading air-quality controversy of the last two years concerns the Bush administration's changes to "New Source Review" (NSR)—a misnomer in that NSR applies to old sources of air pollution: factories, power plants, petroleum and chemical refineries, and so forth. Editorial reaction would lead one to think that the Bush changes to NSR represent the biggest "rollback" since Moses parted the Red Sea, or the greatest advance in regulatory strategy since Moses announced the Ten Commandments.⁷

New York's Attorney General Eliot Spitzer reflects the former reaction, saying in an official statement that "The Bush administration has taken an action that will bring more acid rain, more smog, more asthma and more respiratory disease to millions of Americans." (Spitzer and eight other attorneys general have filed suit to block the new rules.) EPA Administrator Christine Whitman says that "Reforming NSR will promote energy efficiency, plant safety and modernization at refineries, power plants, and other industrial facilities across the country... EPA is taking actions now to improve NSR and thereby encourage emissions reductions." Whitman and Spitzer would seem to be occupying the proverbial different planets.

You won't find much help in sorting this out by reading the previous NSR rules; although the original 1977 rules were only 20 pages long, the EPA had to promulgate 4,000 pages of guidance since 1980 trying to

WHILE PROGRESS ON REDUCING AMBIENT LEVELS OF OZONE HAS SLOWED OVER THE LAST DECADE, THERE ARE NUMEROUS REASONS TO CONCLUDE THAT MAJOR AIR QUALITY IMPROVEMENTS ARE NEARLY CERTAIN TO BE ACHIEVED OVER THE NEXT DECADE.

explain it, and there has been almost constant activity to revise NSR through the rulemaking process. NSR has become the environmental equivalent of the tax code, and the EPA has had the same kind of trouble as the IRS applying NSR consistently. While the NSR controversy is usually discussed in relation to coal-fired power plants, it has wide applicability to many industrial sectors. The EPA identifies about 20,000 “major” sources of emissions that are potentially subject to NSR. Forget Moses—Solomon would have a hard time untangling this mess.

The NSR confusion owes its origins to a sensible-sounding practical compromise over air-pollution policy 25 years ago. When Congress was writing the 1977 Clean Air Act, which imposed tough new emissions standards for industrial sources of air pollution, it recognized that applying the new standards immediately to all existing sources of pollution would be ruinously expensive. No Congress is effectively going to wipe out billions of dollars of investment in power generators, oil refineries, chemical plants, and manufacturing facilities.

The increase in utility rates alone that would have been necessary to replace existing power plants in a short time would have destroyed public support for clean-air regulation. Besides, it was thought unnecessary to require immediate clean up of existing sources because industrial plants and equipment, like our automobiles, have a life cycle of their own, and as they wear out they should be replaced by new facilities that would have to meet the new emissions standards. Thus began what has been referred to as the “grandfathering” of old sources of pollution.

Industrial facilities, however, have a longer life-cycle than automobiles. And the same kind of engineering talent that has enabled auto makers to produce cars that have 95-percent lower emissions than pre-Clean Air Act cars can also be deployed to extend the life of existing industrial facilities. The Clean Air Act contemplated this possibility with a provision that attempted to make a distinction between routine

maintenance and repair of facilities—which would be allowed—and more substantial modification of facilities, which would put the facility over the threshold of requiring attainment of the new emissions standards. In plain language, if you tinker enough with your old source, it becomes a new source, and must meet the new standards.

In the real world of complex modern industry the difference between “modification” and “routine maintenance and repair” is ambiguous.⁸ In large facilities such as power plants, technological improvements (especially in the age of advanced computer controls) often mean that a replacement component is substantially different from the original component it is replacing.⁹ Steady, piece-by-piece improvements in basic technology have extended the life of power plants and other kinds of industrial facilities. Because NSR imposes standards on specific kinds of industrial equipment and requires installing the best available control technology (BACT), going through a NSR review on a case-by-case basis can involve cumbersome and costly engineering reviews by the EPA and the regulated industry that typically takes about eight months, but can take much longer.

NSR in practice makes the EPA the co-manager of a plant, and requires integrating EPA’s technical staff into a plant’s engineering process. This is one reason why there are so few NSR applications; although the EPA identifies 20,000 “major” sources of emissions potentially subject to NSR regulations, there have been only about 250 NSR applications per year. Plant managers rightly see the NSR process as the environmental equivalent of an IRS audit. The perverse incentive for plant managers, therefore, is to keep repairing current facilities rather than upgrading them with newer and more efficient technology.

PLANT MANAGERS RIGHTLY SEE THE
NSR PROCESS AS THE ENVIRONMENTAL
EQUIVALENT OF AN IRS AUDIT.

Environmentalists have cried foul, arguing that industries are building virtually new facilities from the inside-out by exploiting the “routine maintenance and repair” exclusion from NSR.¹⁰ The EPA began to agree and started narrowing the NSR maintenance and repair exclusion in the early 1990s, culminating in the widely-publicized lawsuit against several eastern utility companies in the late 1990s charging that the utilities had cheated on the NSR regulations.

No doubt some industries have gamed the regulations to their advantage, as complying with NSR’s BACT regulations can add enough to the cost of a plant upgrade to make the upgrade uneconomical. The ambiguity of discerning the difference between “substantial modification” and “routine maintenance and repair,” however, is impossible to resolve smoothly and clearly in the existing regulatory framework, and the uncertainty over the narrowing of EPA’s NSR regime was having a sclerotic effect on industrial plants, as managers delayed or cancelled plant upgrades to avoid tripping NSR.

Under quirks of the complicated NSR regulations, in some cases it was possible to be caught up in the regulatory maw even if proposed changes to a facility would reduce pollution. Detroit Edison was challenged for replacing aging turbines with more efficient ones that reduced plant emissions. Other companies got into trouble for replacing aging steam ducts. NSR even trips up high-tech companies. Intel and other microchip companies make hundreds of changes a year to their manufacturing processes, and worry that a narrow application of existing NSR regulations cripples their ability to adapt quickly to fast-moving market conditions.

The Clinton administration recognized the perverse and counterproductive effects of NSR, and proposed some of the very reforms the Bush administration has now adopted. These involve three changes to NSR:

- **Plantwide Applicability Limits (PALs).** PALs will cap total emissions of each type of pollutant from

a facility but allow plant managers to make any equipment changes they want so long as their plantwide emissions remain under the cap. (In other words, for a plant operating at or near the emissions cap, emissions from one piece of equipment could increase only as long as emissions were reduced by the same amount elsewhere in the plant.) PALs will be set according to the highest emissions level of a plant over the last decade. (PALs do not apply to power plants.)

- **The “potential-to-actual test.”** The current NSR process assumes that a plant will be operating at full capacity 365 days a year, around the clock, an unrealistic assumption that often makes modifications in plant operations subject to NSR even if there will be no change in emissions. The Bush administration will change the threshold for initiating NSR from the potential level of a plant’s emissions to projections of the actual emissions a plant will produce. This standard was adopted to recognize the full breadth of the business cycle. Changes to facilities are often undertaken during slack periods of business, when emissions are lower than peak periods of operation; applying NSR standards to emissions at a lower level of production rather than peak production creates a barrier to plant expansion.
- **“Clean Unit” provision.** A facility will be exempt from NSR if it employs pollution control equipment that has been certified as state-of-the-art within the last 10 years.

In addition, a new definition of “routine maintenance and repair” is currently in the rule-making process at EPA. The centerpiece of the proposed new rules would be a cost-based test to distinguish between maintenance and a major modification. For example, if a plant modification costs less than 10 percent of the value of the plant, it would be exempt from NSR. The

cost-based threshold will be industry- and even facility-specific—early EPA guidance suggests the range would be from 1.5 percent to 15 percent, depending on the industry or type of facility.

This summary description of the Bush administration changes to NSR glosses over a vast amount of complicated details that challenge the comprehension even of air-quality experts. Some environmentalists complain that the Bush NSR changes will allow industry to increase emissions significantly by exploiting the fine print of the new NSR regulations. This argument resembles a problem in French literary criticism: it is impossible to resolve the controversy by textual exegesis alone. There are two ways of settling the issue—by superseding NSR with an expanded tradable emissions program and by seeing the results several years down the road.

PRELUDE TO CAP AND TRADE?

The controversy over NSR is an excellent example of the limitation of the traditional method of regulation commonly and simplistically known as “command-and-control,” i.e., applying specific prescriptive technical measures to every identifiable source of air pollution, no matter how small. In the early days of air pollution control this method yielded large results relatively cheaply and quickly because large sources of emissions were easy to identify and control—the so-called “low-hanging fruit.” Nowadays both industry and the EPA chafe at the declining efficiency and effectiveness of the old style of regulation.

For a long while now, a wide range of policy experts have argued that a better solution to the NSR dilemma would be to scrap NSR and replace it with pollution caps and an emissions trading regime (known as “cap and trade” for short). The 1990 Clean Air Act took the first step down this road with a cap-and-trade program for sulfur oxides. The Progressive Policy Institute, the think-tank arm of the Democratic Leadership Council, calls for extending this approach by abolishing NSR and replacing it with a cap-and-trade program for sev-

eral pollutants at once. “Once these caps are imposed,” PPI says, “NSR no longer provides any significant emissions reductions, and eliminating these NSR provisions for new sources has the potential to actually boost cleaner energy technologies by equalizing the economic burden for pollution control placed on old and new sources.”¹¹

This is similar to what the Bush administration has outlined in its “Clear Skies” proposal, which will scrap NSR for electric power generation. Clear Skies will impose new caps on emissions of sulfur oxides (SO_x), nitrogen oxides (NO_x), and mercury, reducing SO_x and NO_x emissions by 70 percent by the year 2018 (with intermediate caps taking hold in 2010).

By moving ahead first with NSR rule changes, critics say the Bush administration has put the cart before the horse and given up political leverage on Congress to enact Clear Skies. But the political logic of air-quality policy is a two-way street. Members of Congress who sincerely believe the Bush NSR reforms threaten to make pollution worse can obviate this prospect by enacting Clear Skies. Some environmental organizations oppose cap and trade proposals for the self-serving reason that they would put an end to one of their favorite activities: filing lawsuits against the EPA and private companies to bend regulatory policy to their will. The practice is both lucrative and effective.¹²

Beyond the insincerities of some environmental lobbies, the basic ideological split between the two parties at work can be observed once again. The dispute over how reformed NSR rules and Clear Skies will work in practice is in form very similar to the arguments over

THE PROGRESSIVE POLICY INSTITUTE, THE THINK-TANK ARM OF THE DEMOCRATIC LEADERSHIP COUNCIL, CALLS FOR EXTENDING THIS APPROACH BY ABOLISHING NSR AND REPLACING IT WITH A CAP AND TRADE PROGRAM FOR SEVERAL POLLUTANTS AT ONCE.

supply-side economics and tax cuts. The conservative argument in favor of NSR reform and emissions trading is not only that it will reduce the economic cost of cutting pollution, but also that it will do so more quickly and effectively. Liberals have less confidence in market solutions, and insist, in the case of the economy, that government-directed stimulation generates economic growth, and, in the case of the environment, that only aggressive regulation can clean up the air. This is how the debate in Congress over Clear Skies is likely to unfold.

One of the odd criticisms opponents of the Bush reforms are making is that the EPA cannot offer models or projections of the effects of the NSR changes on air quality. This is a strange objection because the EPA is unable to provide estimates of the effects of the *current* NSR regime on air quality because of inadequate data and limited modeling capabilities. Although EPA believes that its current NSR regime delivers meaningful benefits (since when has a regulatory agency publicly doubted its efficacy?), the fact that there are no reliable data on which to compare before and after results of the new NSR regime means that the argument will go on forever—or at least until the results are in.

NOTES

- 1 Ambient air pollution levels are measured several ways, and the EPA offers a range of percentile distributions. For simplicity's sake, we use the EPA's arithmetic mean measurements.
- 2 See Gary Polakovic, "2002 Spike in Air Pollution Reverses Downward Trend," *Los Angeles Times*, October 13, 2002, p. A-1.
- 3 R. Beasley, *et al.*, "Worldwide variation in prevalence of symptoms of asthma, allergic rhinoconjunctivitis and atopic eczema," *ISAAC, Lancet* 1998; 351: pp. 1225-32.
- 4 www.nationalasthma.org/au/publications/cam/trends.html.
- 5 A comprehensive account of the factors that will lead to cleaner air over the next decade will be provided in a forthcoming publication by Joel Schwartz, "No Turning Back: Why Air Pollution Will Continue to Decline" (working title), American Enterprise Institute.
- 6 Andrew J. Kean, Robert F. Sawyer, Robert A. Harley, and Gary R. Kendall, *Trends in Exhaust Emissions from In-Use California Light-Duty Vehicles, 1994-2001*, Society of Automotive Engineers, 2002.
- 7 *New York Times* columnist Paul Krugman wrote that NSR reform "marks the beginning of a new era of environmental degradation." The Charleston (WV) *Gazette* (November 29, 2002, p. 4A) called the Bush NSR changes "a sneak attack on the air you breathe." The Philadelphia *Inquirer* (November 28, 2002) editorialized that "Air pollution in the Northeast is about to get a whole lot worse." On the other side, the Albany (NY) *Times-Union* (December 9, 2002, p. A-10) editorialized that the NSR changes will provide "greater clarity to the clean-air program called New Source Review and will result in greater environmental protection"; and the *Rocky Mountain News* (December 3, 2002, p. 30A) said the changes "make good environmental sense."
- 8 The Clean Air Act defines "modification" as "any physical change in, or change in the method of operation of, a stationary source which increases the amount of any air pollutant emitted by such source or which results in the emission of any air pollution not previously emitted." Routine maintenance and repair has been left more or less undefined.
- 9 An example in the electric utility sector is replacing a "forced-draft" system with a "balanced draft" system for air injection into furnaces.
- 10 While environmentalists hollered, some industry groups also expressed disappointment, with the Edison Electric Institute saying that the Bush changes don't go far enough.
- 11 Byron Swift and Jan Mazurek, *Getting More for Four: Principles for Comprehensive Emissions Trading* (Washington, D.C.: Progressive Policy Institute, October 2001), p. 3.
- 12 The classic analyses of this kind of litigation are R. Shep Melnick, *Regulation and the Courts: The Case of the Clean Air Act* (Washington, D.C.: Brookings Institution, 1983) and Jeremy Rabkin, *Judicial Compulsions: How Public Law Distorts Public Policy* (New York: Basic Books, 1989).

WATER QUALITY

Systematic measurement of water quality remains elusive. Only 19 percent of river and stream miles were assessed in the U.S. Geological Survey's most recent National Water Quality Inventory, and there is no way to extrapolate from this sample about the condition of the remaining 81 percent. It is also difficult to compare data from one state to another because they often use different indicators to assess the attainment of standards, or even may have different standards.

Nevertheless, it is clear that water quality has improved in the last 30 years. And while the change nationwide has not been dramatic, local success stories often demonstrate substantial improvements.

There is little doubt that water quality has improved since the first Earth Day in 1970, and there are numerous signs of the increasing sophistication of water-quality protection. Yet the overall picture remains murky, so to speak. A. Myrick Freeman III of Resources for the Future concludes in a recent overview: "Water quality has improved since 1972. In terms of aggregate measures or national averages, the change has not been dramatic, but local success stories report substantial cleanup in what had been seriously polluted waterbodies."¹

The major reason for the tentativeness about water quality trends is that we still are not capable of measuring water quality systematically for the purposes of national reporting in the same way we measure air pollution. The best that can be said is that the EPA and other government agencies are pressing hard to develop better and more consistent data on water quality, but there is still a long way to go. For the meantime, researchers must pick over the partial sources for clues.

THE 2000 NATIONAL WATER QUALITY INVENTORY

Every two years the EPA produces the National Water Quality Inventory (NWQI), which is mandated by the Clean Water Act and compiled from reporting by all 50 states. Despite its comprehensive-sounding name ("inventory"), the NWQI is extremely limited as an indicator of overall water quality, and incapable of providing accurate trend information. It would be more appropriate to think of the NWQI as an "audit" rather

than an "inventory." Only 19 percent of river and stream miles, for example, were assessed in the most recent NWQI (down from 23 percent in the 1998 NWQI), and there is no way to extrapolate from this sample about the condition of the 81 percent of river and stream miles not assessed.

The EPA is careful to note that the states "do not use identical methods to rate their water quality nor are their water quality standards identical." Translation: The EPA cannot vouch for the accuracy or consistency of NWQI results. Put more crudely, there is a "garbage-in, garbage-out" problem with this data set.

The 1998 NWQI report was candid about this problem: "*Without consistent monitoring and assessment methods in place, EPA and states cannot compare data over time to identify trends in water quality.*" For example, states and other jurisdictions may modify their standards or assess different water-bodies from one reporting period to the next.

Similarly, it is difficult to compare data from one state to another because they may use different indicators to assess attainment of water quality standards, and are quite likely to have different standards."² This does not stop some environmental groups from misusing NWQI data. The Natural Resources Defense Council (NRDC), for example, writes in a recent report that based on NWQI data "45 percent of the national waterways are too polluted for fishing and swimming, up from 40 percent two years ago."³

The EPA is stepping up efforts to improve the rigor and consistency of water quality data.⁴ In the meantime, we pass along the NWQI findings for 2000—the most recent report available—for the limited perspective they provide.

The NWQI judges water quality according to five purposes—aquatic life support (chiefly birds), fish consumption, swimming, drinking water, and agriculture. In the 2000 NWQI, 61 percent of river and stream miles were judged to be "fully supporting" or "good" for all five uses—compared to 65 percent in the 1998 NWQI. The other 39 percent are not necessarily

ONLY 19 PERCENT OF RIVER AND STREAM MILES WERE ASSESSED IN THE MOST RECENT NWQI AND THERE IS NO WAY TO EXTRAPOLATE FROM THIS SAMPLE ABOUT THE CONDITION OF THE 81 PERCENT OF RIVER AND STREAM MILES NOT ASSESSED.

polluted beyond use; water bodies may be impaired for only one of the five uses. The 2000 NWQI assessed 43 percent of the nation's lakewater area, finding that the proportion of lakes rated as “fully supporting” or “good” comes in at 55 percent—the same result as was found in the 1998 NWQI.

NATIONAL COASTAL CONDITION REPORT

The NWQI also reports on water quality in estuaries; however, the NWQI's limited survey has been superseded by the *National Coastal Condition Report* (NCCR), a joint effort of EPA, the Department of Agriculture, the Department of the Interior, and the National Oceanic and Atmospheric Administration.⁵ Released in early 2002, the NCCR developed seven core indicators of coastal water conditions: water clarity, dissolved oxygen, wetland loss, eutrophy (excess nutrients), contaminated sediments, fish contamination, and a benthic index (shellfish and mollusk health). Data for the first NCCR was gathered from 1990 to 1997; a second report is planned for 2005.

The NCCR devised a rating scale of one to five (where one is poor and five is good), giving an overall rating of 2.4 for the nation's coastal waters. Table 1 below shows how each region ranked for each indicator. But once again, caution should be used in generalizing from this data.

TABLE ONE: SUMMARY OF COASTAL CONDITION INDICATORS AND RANGE

	N.E.	S.E.	Gulf of Mexico	West	Great Lakes	U.S.
Water Clarity	5	4	3	5	5	4.3
Dissolved Oxygen	4	5	5	5	5	4.5
Wetland Loss	2	2	1	1	1	1.4
Sediments	1	3	1	1	1	1.3
Benthos	1	2	1	3	3	1.4
Fish Contamination	1	5	1	3	3	1.9
Eutrophy	1	4	1	1	1	1.7
Overall	2.1	3.6	1.9	2.7	2.7	2.4

source: NCCR

“Using indicators to compare estuarine conditions throughout the nation can be misleading,” the EPA says in the report, “because the national state of estuaries varies throughout the nation. For example, estuaries throughout the Southeast tend to have poor water clarity due to high turbidity that results from naturally high productivity and strong sediment transport and resuspension processes. So the ‘fair’ water clarity rating in southeastern estuaries does not necessarily mean that water quality is poor or degraded.”⁶

While the methodology of the NCCR may be criticized in various ways, a consistent method of assessing coastal waters will help us judge trends with future iterations of the report.

USGS NATIONAL WATER QUALITY ASSESSMENT

While data for a national trend assessment are not yet available, there are several good sources of detailed local information. The U.S. Geological Survey's (USGS) National Water Quality Assessment has produced 36 detailed reports on major river basins throughout the nation. The reports are available at <http://water.usgs.gov/nawqa/nawqasum/>.

The USGS also operates the National Stream Quality Accounting Network (NASQAN), which monitors water quality in four large river basins (Colorado, Columbia, Mississippi, and Rio Grande) and the major tributaries of these rivers. The program offers some trend data for these river basins, found at <http://water.usgs.gov/nasqan/>.

Even with this more detailed data, the Geological Survey, like the EPA, cautions that “Water quality is constantly changing, from season to season and from year to year. Long-term trends are sometimes difficult to distinguish from short-term fluctuations. For many chemicals, it is too early to tell whether conditions are getting better or worse because historical data are insufficient or too inconsistent to measure trends.”⁷

The EPA has upgraded its online water quality data for watersheds, at www.epa.gov/storet/. (This site is

cumbersome and requires the user to download special free software to use the data files.) The watershed data on this EPA site concentrate especially on effluent discharge and biological conditions.

Other useful websites include:

- The National Hydrology Dataset offers spatial images of watersheds, integrating data from the Toxics Release Inventory and tracking water bodies where Total Maximum Daily Load (TMDL) programs are being implemented. (<http://nhd.usgs.gov/>)
- The Watershed Information Network also offers “geospatial” images of local watersheds, and links to dozens of state, local, and private water monitoring programs. (www.epa.gov/win/)
- A related EPA site, the Index of Watershed Indicators, offers data on 18 different indicators of water quality in 2,111 watersheds throughout the U.S. The EPA’s 1996 report launching this project acknowledges the gaps and limitations of the currently available data, which provide a roadmap for improvement. This is one of the easier sites for the non-expert citizen to use. (www.epa.gov/iwi/)
- The North American Lake Management Society operates a remote-sensing water quality program using satellite imagery for lakes in Michigan, Minnesota, and Wisconsin (including the Great Lakes contiguous to these states) at <http://resac.gis.umn.edu/lakeweb/index.htm>.

GULF HYPOXIA

One of the most important findings of the USGS NAQWA is the worsening trend of “nitrogen transport” down the Mississippi River basin to the Gulf of Mexico. This is responsible for hypoxia—a condition

of oxygen depletion. Excess nitrogen causes large algae blooms that suck up a disproportionate share of dissolved oxygen in water bodies.

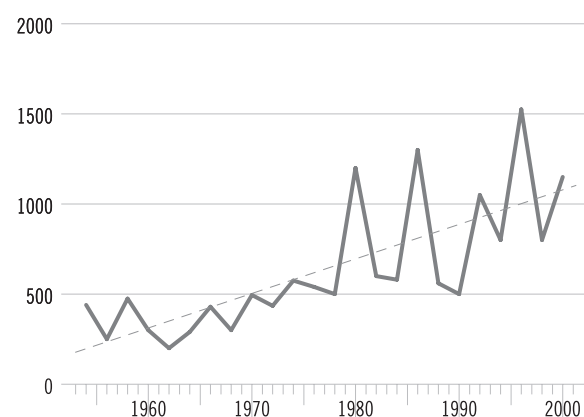
The hypoxia of the Gulf of Mexico is more commonly known as the “dead zone,” and it can cover as much as 5,000 square miles. The Heinz Center report on the state of U.S. ecosystems aggregated various strands of USGS data to reveal that the nitrate loads of the Mississippi River basin have more than doubled over the past 50 years. (See Figure 1.)

One of the odd aspects of this discouraging trend is that national environmental groups say so little about it. This is probably for two reasons. First, this problem is not the focus of any specific national regulatory program that environmentalists could accuse the Bush administration of attacking. Second, this problem is almost wholly generated by agriculture (the NWQI says that agriculture is the largest source of water quality degradation for rivers, streams, and lakes as well), and farmers are harder to demonize than “industry.”

DRINKING WATER IMPROVEMENTS

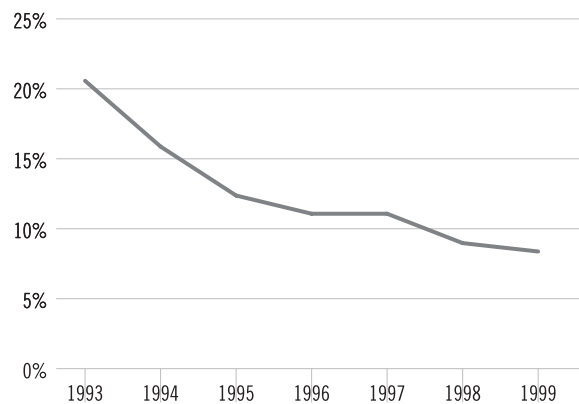
The controversy over the arsenic standard for drinking water in 2001 raised anew the safety of the nation’s drinking-water supply. While water quality obviously

FIGURE ONE: NITRATE LOADINGS ON THE MISSISSIPPI RIVER



source: Heinz Center

FIGURE TWO: CHILDREN LIVING IN AREAS SERVED BY PUBLIC WATER SYSTEMS THAT EXCEED A DRINKING WATER STANDARD OR VIOLATED TREATMENT REQUIREMENTS



source: U.S. Environmental Protection Agency

depends on local conditions, new EPA data illuminate substantial progress in improving the safety of the drinking-water supply. The EPA's second report on children and the environment, which was released as this *Index* was going to press, contains a data series on the percentage of children living in areas served by public water systems that exceeded a drinking water standard or violated treatment requirements.⁸ Figure 2 shows the trend: the percentage of children exposed to unsafe water declined from 20 percent in 1993 to just 8 percent in 1999—a 60 percent decline.⁹

OIL SPILLS

With the continuing controversy over offshore oil drilling, it is worth noting the third *Oil in the Seas* report from the National Academy of Sciences (NAS).¹⁰ (The first such report was produced in 1975 and was updated in 1985.) There are four sources of

TABLE TWO: SOURCES OF OIL IN U.S. OCEAN WATERS

	Metric Tons/Year
Natural Seepage	160,000
Extraction/Production	3,000
Transportation	9,100
Consumption	84,000
Total	260,000

source: National Academy of Sciences

“petroleum inputs”—as the NAS report calls them—into ocean waters near the U.S. coast: natural seepage, exploration and production, transportation, and consumption. Guess which source is the smallest? The answer is found in Table 2.

Natural sources of oil seepage generate 50 times more oil than offshore oil drilling generates. Consumption of oil—which means runoff from oil spilled on the ground or poured out improperly, and inefficient two-stroke engines—generates 28 times as much oil in water as oil wells do. As the NAS report notes, consumption generates 70 percent of man-made oil in ocean waters—not oil drilling and production. Someone should call Pogo.

NEW HOPE FROM WATER TRADING?

Ever since the passage of the Clean Water Act in 1972, national policy has focused chiefly on technological improvements to so-called “point sources” of water pollution (such as wastewater treatment plants and industrial facilities) administered through a regulatory permit system. This regime, according to EPA estimates, costs about \$50 billion a year—not an inconsiderable sum.

It has long been recognized that further improvement in water quality will have to find ways to reduce

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NATURAL SOURCES OF OIL SEEPAGE GENERATE 50 TIMES MORE OIL THAN OFFSHORE OIL DRILLING GENERATES.

“non-point” sources of pollution, especially runoff from agriculture. The next generation of water pollution control contemplated under the Clean Water Act is known as the “Total Maximum Daily Loads” (TMDL) program. As the title implies, the TMDL program will attempt to assess how much pollution a local watershed can absorb and process naturally, and then design local regulatory measures to reduce pollution inputs below that threshold level.

Traditional prescriptive regulation for individual non-point sources is going to be difficult, cumbersome, and expensive. The TMDL program has been unfolding at a glacial pace—even for the government—because of the inherent contentiousness of such a sweeping objective. Estimates of the cost of a fully implemented TMDL program range up to more than \$20 billion; in other words, we have no idea how much it may cost.

In an effort both to reduce costs and increase effectiveness, the EPA recently announced a framework to use water trading as the primary strategy for decreasing non-point water pollution. Trading in water pollution would work much like the trading in sulfur dioxide emissions that has been in operation over the last decade to reduce air pollution. The key difference is that while sulfur dioxide emissions trading takes place almost exclusively between stationary sources of pollution (such as power plants), water trading involves exchanges between point sources and non-point sources. For example, a wastewater treatment plant might obtain tradable credits from pollution reductions undertaken by a farm or ranch, so long as it is in the same watershed.

The ability of non-point sources such as farms to obtain marketable credits for water pollution abate-

ment activities provides an early incentive to adopt best practices. In addition, the water trading policy the EPA has announced will allow for some cross-pollutant trading; i.e., it will be possible to trade credits for nitrates for credits in phosphorus or other pollutants. If clean water standards can be met through a water-trading scheme, implementing a command-and-control oriented TMDL regulatory regime won't be necessary.

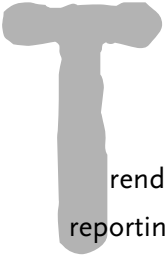
A few pilot projects, such as the Tar-Pamlico River Basin in North Carolina (reported in the fifth edition of the *Index* in 2000), have demonstrated the success of this approach. The Clinton administration, which began developing a water-trading policy approach in 1996, estimated that water trading could cut the cost of reducing non-point pollution by as much as \$7 billion a year, and would likely speed the pace of cleanup. Several leading environmental groups (Sierra Club, Natural Resources Defense Council, and National Wildlife Federation) oppose the new policy.

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NOTES

- 1 A. Myrick Freeman III, "Water Pollution Policy," in Paul Portney and Robert Stavins, eds., *Public Policies for Environmental Protection*, 2nd edition (Washington, D.C.: Resources for the Future, 2000), p. 189.
- 2 1998 *National Water Quality Inventory*, U.S. EPA, p. 4.
- 3 Robert Perks and Gregory Wetstone, *Rewriting the Rules, Year-End Report 2002: The Bush Administration's Assault on the Environment* (Washington, D.C.: NRDC, 2003), p. 16.
- 4 These efforts include a new report format, known as the *Integrated Water Quality Monitoring and Assessment Report* (see www.epa.gov/owow/tmdl/2002wqma.html), and the Consolidated Assessment and Listing Methodology (CALM; see www.epa.gov/owow/monitoring/calm.html).
- 5 The report is available online at www.epa.gov/owow/oceans/NCCR/index.
- 6 *National Coastal Condition Report*, p. xviii.
- 7 <http://water.usgs.gov/pubs/circ/circ1225/html/national.html>.
- 8 The report, *America's Children and the Environment: Measures of Contaminants, Body Burden, and Illnesses*, is available at www.epa.gov/envirohealth/children. See Table E-6, p. 136, for data.
- 9 The EPA data track five different kind of drinking water quality violations: lead and copper; microbial contaminants; chemical and radiation contamination; high nitrate/nitrite levels; and treatment and filtration violations.
- 10 www.nap.edu/books/0309084385/html/.

TOXIC CHEMICALS



Trends in the output of toxic chemicals are based on the EPA's Toxics Release Inventory (TRI), a reporting system for more than 650 chemicals. While the total output of the industries covered under the TRI has increased 40 percent since 1991, the level of toxic releases has declined – 51.2 percent since 1988. The reduction in the use of chemicals, even as industrial output and economic activity grow, is a sign of the increasing efficiency of our industrial plants and the “de-materialization” of the economy.

THE TOXICS RELEASE INVENTORY

The principal source of trend data for toxic chemicals is the Environmental Protection Agency's (EPA) Toxics Release Inventory (TRI), a reporting system for more than 650 chemicals (up from 300 when the TRI began in 1988) used in most major industries, mining operations, and, more recently, federal facilities.¹ More than 20,000 individual facilities must provide information for the TRI, requiring more than 80,000 reporting forms.

The EPA emphasizes several important caveats about interpreting TRI data, including gaps in the data and the lack of straight-line applicability of human health risk. The latest TRI, for the year 2000, emphasizes that "TRI reports reflect releases and waste management activities of chemicals, not exposures of the public to those chemicals. Release estimates alone are not sufficient to determine exposure or to calculate potential adverse effects on human health and the environment" (pp. 1-6).

In addition, "toxic" chemicals are not all created equal, which is why a crude measure of mere "pounds" of toxics "released" is not an especially helpful measure of health or environmental risk. As the EPA notes:

Some high-volume releases of less toxic chemicals may appear to be a more serious problem than lower-volume releases of more toxic chemicals, when just the opposite may be true. For example, phosgene is toxic in smaller quantities than methanol. A comparison between these two chemicals for setting hazard priorities or estimating potential health concerns, solely on the basis of volumes released, may be misleading.²

In an effort to make possible better judgments about the relative risks of different kinds of toxic chemicals, the EPA is developing the Integrated Risk Information System (IRIS) on its website (see www.epa.gov/ncea/

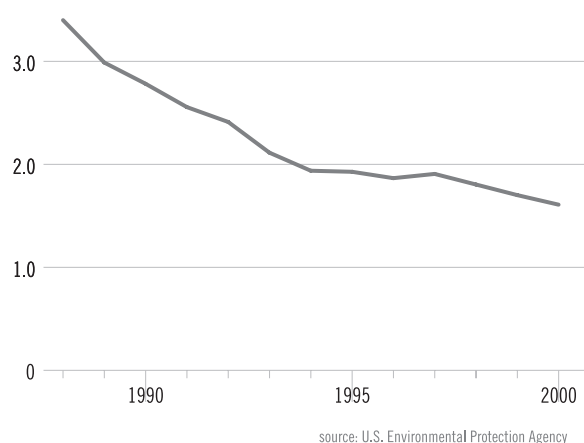
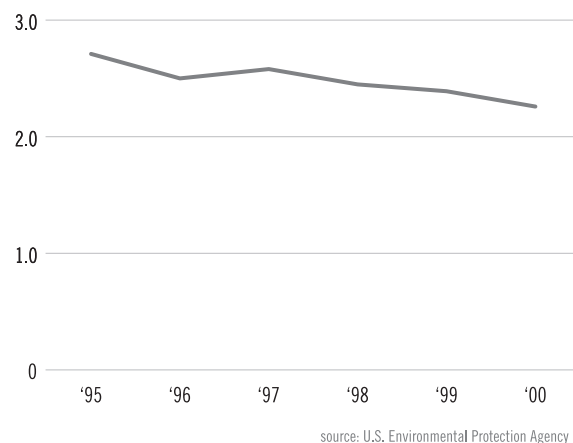
iris.htm). IRIS contains the results of ongoing toxicological screens of many of the chemicals on the TRI, along with links to other studies and EPA standards for exposure to the chemical. IRIS is not easy for the non-specialist to use, but it represents a major effort to adapt the massive reporting of the TRI into a useable product for local risk assessment. Another resource is EPA's chemical fact sheets, which are available at www.epa.gov/chemfact/.

With all of these caveats and limitations, what does the TRI tell us? While the TRI is limited as a tool for judging environmental or health risk, it is indicative of another trend: the reductions in the use of chemicals, even as total industrial output and economic activity grow, are a sign of the increasing efficiency of our industrial plants, and a measure of what has been called the "de-materialization" of the economy.

As such, the TRI can be viewed as a proxy for measuring "sustainable development" or industrial ecology. The constant expansion of the number of chemicals and number of facilities included in the TRI data net makes tracking trends difficult. Fortunately, the EPA helpfully breaks out the data against a 1988 baseline that includes only the chemicals listed in the original inventory (shown in Figure 1).

This measure shows a 51.2 percent decline in toxic releases since 1988 (and a reduction of 5.1 percent in 2000), a reduction of over 1.7 billion pounds a year. (The chemical industry, not surprisingly, has shown the largest decrease of all industries included in the TRI, with a 60-percent reduction in releases since 1988.) These industry reductions reflect mostly productivity gains and technological improvements; total output of the industries covered under the TRI has increased 40 percent since 1991, even as toxic releases have declined.

THE TRI CAN BE VIEWED AS A PROXY FOR MEASURING "SUSTAINABLE DEVELOPMENT" OR INDUSTRIAL ECOLOGY.

FIGURE ONE: TOXICS RELEASE INVENTORY, 1988 BASELINE**FIGURE TWO: TOXICS RELEASE INVENTORY, 1995 BASELINE**

The EPA added chemicals to the TRI list throughout the 1990s, and began a new baseline for the TRI starting with 1995. Figure 2 shows a steady declining trend with the exception of an uptick in 1997. This larger list of toxics tracked in the TRI has declined by 10.6 percent since 1995.

HUMAN EXPOSURE TO ENVIRONMENTAL CHEMICALS

Starting in 2000 the EPA is now including in the Toxics Release Inventory releases of PBTs—persistent bioaccumulative toxics—such as mercury, PCBs, and dioxin. Trend analysis will have to wait for at least one more year since the 2000 TRI only provides researchers with a single data point.

In the meantime, it is helpful to examine the data in the Centers for Disease Control's (CDC) *Second National Report on Human Exposure to Environmental Chemicals*.³ Ever since Rachel Carson's *Silent Spring*, chemophobia has been a staple of environmental alarmism, with occasional panics over particular chemicals (e.g., the pesticide Alar in 1989, or the plastic additives known as phthalates in 1997) that often coincide with fundraising drives by the more politicized environmental activist groups.⁴

For more than two decades the CDC has participated in a health study known as the National Health and

Nutritional Examination Survey (known by its acronym NHANES), which was designed to quantify and track health hazards from diet and exposure to the most prominent known environmental health hazards, such as lead. In 1999 the CDC decided to expand the scope of NHANES to begin tracking a broader range of heavy metals and synthetic chemicals that are widely present in the environment, such as organophosphate pesticides, and phthalates.

The CDC's first report in this series was released in March, 2001; it covered just 27 chemicals of interest and was limited to a small sample size. The latest report expanded the number of tracked chemicals to 116, along with 12 heavy metals. As the data accumulate over time health researchers will be able to determine whether human exposure to chemicals is increasing or decreasing. But the trend data alone cannot judge health risk.

The CDC study determines chemical levels in human blood and/or urine samples. The CDC is quick to point out that "Just because people have an environmental chemical in their blood or urine does not mean that the chemical causes disease." One reason the CDC has begun tracking these compounds in human tissue and fluids is that our analytical methods are now advanced enough to allow us to detect extremely small traces of these chemicals.

NO HEAVY METAL MADNESS

The result from the first two years of this effort suggests that the amounts of chemicals in humans are stable or declining. In the case of lead we now have more than 20 years of data, which show a major decline. In the late 1970s, 88 percent of children aged one to five had blood-lead levels above the threshold where harm to cognitive development is feared; in the latest data, only 2.2 percent of young children exceed the threshold—a 50 percent decline in the last 10 years. (See Figure 3.)

For many of the metals and chemicals tracked in the CDC study, there is not yet sufficient medical knowledge to set an “unsafe” threshold of human exposure. There are, however, health-based exposure standards from the Occupational Safety and Health Administration (OSHA) and the EPA for five of the 12 heavy metals tracked in the CDC study. The CDC findings show that levels of five heavy metals (mercury, cadmium, cobalt, uranium, and lead) are far below the threshold of health risk. Figure 4 displays the average exposure level and exposure level at the 90th percentile (i.e., for the 10 percent of people with the highest exposure amounts in the sample) expressed as a fraction of the health risk threshold. (For example, the health-based threshold for Mercury is 59 ug/l; the

90th percentile finding of 2.48ug/l represents only 4.2 percent of the level judged to be a health risk.)

For the seven other heavy metals in the report (barium, cesium, molybdenum, platinum, thallium, tungsten, and antimony), average exposure levels and exposure levels at the 90th percentile fell for five of the seven and rose slightly for antimony. Platinum was present at such low levels that it was undetectable.

DON'T PALPITATE OVER PHTHALATES, OR FLEE OVER PCBS

The new CDC report contains a second data point for the family of chemicals known as phthalates. There is at present no health-risk threshold or even agreement about whether phthalates are potentially harmful to human health. Phthalates have raised the usual red flags in animal tests, which is why some environmental groups have put phthalates on their target list. Of the seven different varieties of phthalate compounds tracked in the CDC study, four are at such low levels in urine samples as to be undetectable. Of the remaining three, two showed slight declines, while only one (mono-ethyl phthalate) showed an increase.

The CDC study also screened for 40 different PCB and dioxin compounds, finding in almost every case that levels in human samples were below the level of

FIGURE THREE: BLOOD-LEAD LEVEL IN CHILDREN AGES ONE TO FIVE

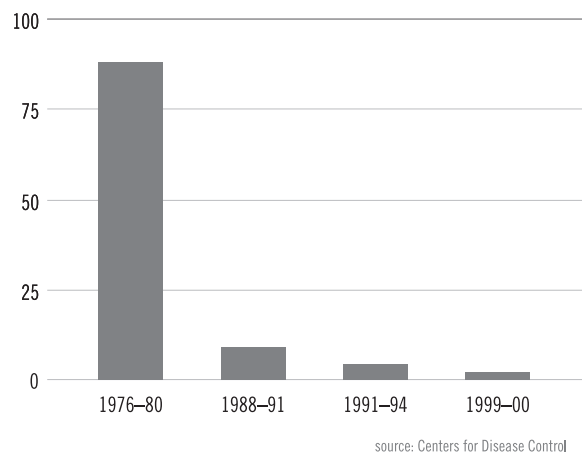
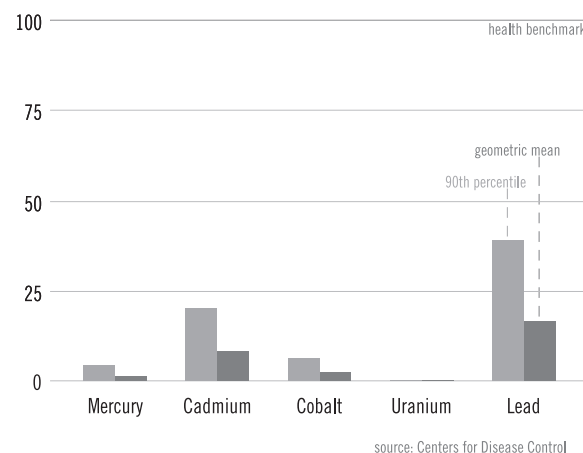


FIGURE FOUR: HEAVY METAL EXPOSURES (% OF HEALTH-BASED BENCHMARK)

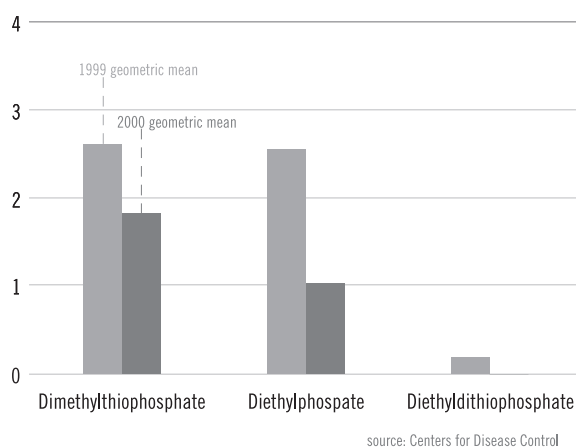


detection. In a few cases a detectable amount showed up at the 90th percentile (the 10 percent of the sample with the highest levels), but future data points will be necessary to see if there is cause to believe human exposure is increasing.⁵

The first CDC study only screened for six organophosphate pesticides, of which only three were found in detectable levels in the entire sample. The levels fell sharply for all three in the new study, and were undetectable in one. (See Figure 5.) The new study expanded its scope to include 25 more organochlorine pesticides, and 12 other herbicides and pesticides, including DEET, the mosquito repellent popular with people who engage in outdoor activities. DEET turned out to be undetectable in humans at any level, because the body quickly and fully processes and expels DEET. Good news for barbecue season. As with phthalates, there are currently no health standards for many organophosphate pesticides, though testing is underway to determine if a health threshold is warranted.

A substance that is known to last long in human tissue is hexachlorobenzene (HCB), which was banned in the U.S. in 1984 because of its proven toxic effects in humans. Although HCB can last in human fatty tissues up to 15 years, the CDC study found no detectable levels of HCB.

FIGURE FIVE: LEVELS OF ORGANOPHOSPHATE PESTICIDES IN HUMAN URINE



The CDC screening still detects DDT—another long-lasting organochlorine—but notes that the level in humans is about 15-fold lower than it was in 1976. Likewise, the study finds that the level of cotinine (a metabolite of nicotine, and therefore a marker for second-hand tobacco smoke) in children’s blood has fallen 75 percent over the last decade. Whether second-hand tobacco smoke is a genuine health hazard is hotly debated, but the data are nonetheless useful because they show the resilience of the human body.

While there are dozens of categories of synthetic chemicals worthy of study that are not yet included in the CDC study—including a few such as poly-brominated di-phenyl ethers (PBDEs) that show some signs of being persistent, bioaccumulative toxics—the CDC effort to study human chemical exposures closely will help dispel public chemophobia.

TIME TO RETHINK TOXICOLOGY?

The cornerstone of modern toxicology is the dose-response relationship. For carcinogens, science has assumed that any dose is *ipso facto* dangerous (in other words, the “safe” threshold for a carcinogen is zero exposure), while non-carcinogens are assumed to have a dose-response threshold below which an individual is considered safe—the scientific equivalent of the folk wisdom that “the dose makes the poison.”

What if this model is wrong, and small exposures to toxic substances or carcinogens may actually be *good* for the body? This subversive and heterodox idea has been floating around among contrarians and iconoclasts for several years, but now two scientists from the Department of Environmental Health Sciences at the University of Massachusetts have put together the serious case in a stunning commentary in *Nature* magazine.⁶ The authors,

WHAT IF SMALL EXPOSURES TO TOXIC SUBSTANCES OR CARCINOGENS MAY ACTUALLY BE GOOD FOR THE BODY?

Edward J. Calabrese and Linda A. Baldwin, argue that rather than posing a risk, low doses of toxic substances stimulate the body's defenses in positive ways, a process known as "hormesis."

"The toxicology community made an error of historic proportions (the 1930-40s) in buying into the threshold model," Calabrese and Baldwin argue. They point out the experimental results showing that low level exposure to dioxin, cadmium, and various polycyclic aromatic hydrocarbons, as well as various forms of radiation, has been shown to reduce tumors in some species. Low levels of X-rays have produced longer life spans in mice and guinea pigs, and small exposures of acetaldehyde have extended the life span of fruit flies. These low-dose effects have long been observed by researchers, but have always been written off as "biologically irrelevant" variation. One reason for this resistance is that our testing methodology is not organized to test for hormesis.

The authors rightly suggest that the implications of this viewpoint are enormous. But let them tell it:

The hormetic perspective also turns upside down the strategies and tactics used for risk communications of toxic substances for the public. For the past 30 years, regulatory and/or public health agencies in many countries have "educated"—and in the process frightened—the public to expect that there may be no safe exposure level to many toxic agents, especially carcinogens such as radiation and dioxins. If the hormetic perspective were accepted, the risk-assessment message would have to change completely. Changing a dominant risk-communication paradigm is not as simple as flicking on a light switch. It changes beliefs, atti-

tudes, and assumptions, not unlike changing from a Soviet-style society to a western one. It would certainly be resisted by many regulatory and public health agencies as an industrial-influenced, self-serving scheme that could lead to less costly, less protective clean-up standards, reminiscent of attempts by early opponents of hormesis to link it with homeopathy.

NOTES

- 1 The TRI can be downloaded from the EPA website at www.epa.gov/tri/. Individual state fact sheets are also available on this site.
- 2 EPA, 2000 *TRI*, pp. 1-9.
- 3 The complete 257-page report can be downloaded from the CDC's website, www.cdc.gov/exposurereport/.
- 4 Alar was a preservative used mostly on apples; Phthalates are a compound common in soft plastic products including baby pacifiers as well as in consumer products, such as shampoo and nail polish; they have been attacked by some environmental groups as a possible carcinogen.
- 5 The CDC is quick to point out that even in the few cases where detectable amounts of PCBs were found, "Finding a measurable amount of one or more PCBs in the blood does not indicate that the levels of the PCBs cause adverse human health."
- 6 Edward J. Calabrese and Linda A. Baldwin, "Toxicology rethinks its central belief: Hormesis demands a reappraisal of the way risks are assessed," *Nature* (vol. 421), February 13, 2003, pp. 691-692.

SPECIAL REPORT: STATUS AND TRENDS OF AMERICA'S FORESTLANDS

Despite a widespread belief that forests are declining, the total area of forests nationwide has been fairly stable since about 1920 and actually increased between 1990 and 2002. However, the Forest Service estimates that as many as 190 million acres of public land are at increased risk of catastrophic fire because of overgrown conditions. How to manage these lands is the source of much political wrangling, and it is likely to remain that way.

As the Forest Service has admitted, “There will likely always be debate about how this management relates to protection and maintenance of biological diversity.” Of course, this really comes down to a matter of property rights. On private lands, more aggressive thinning and management practices can proceed without legal and bureaucratic interference, and as a result they are managed in a more sustainable manner.

Early editions of this *Index* presented a simple metric on American forests showing that the volume of tree growth has been exceeding the volume of trees harvested for most of the last 50 years. This measurement is inadequate, and consequently was dropped from recent editions. Not all trees and forests are created equal, so to speak, and considerations of forest fragmentation, among other variables, were not systematically measured.

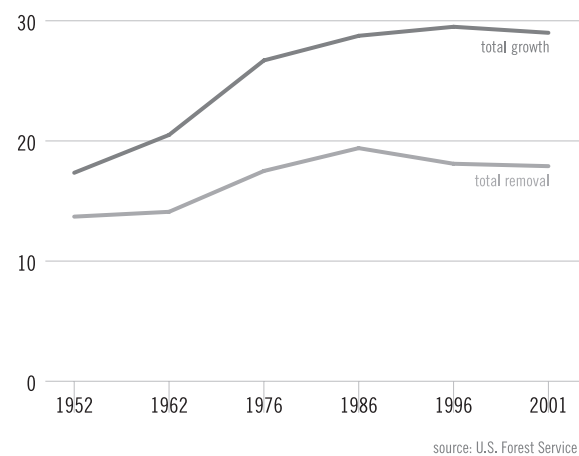
America's 750 million acres of forestland comprise more than 850 species of trees in at least three broad types of forest (broadleaf, conifer, and mixed oak-pine-cypress); 419 native mammal species; 281 reptile species; 240 species of amphibians; and more than 650 species of birds and 800 species of freshwater fish.

Contrary to a frequent claim, there is not more forest area in America now than at the beginning of European settlement in the 17th century; there were about 1.1 billion acres of forests in the U.S. in 1630—about 25 percent more than the current area. However, forest area has been stable for nearly a century, rising slightly over the last decade. (Forest area grew by eight million acres from 1987 to 1997, according to the Heinz Center.) Then there is the issue of what constitutes forest “sustainability.”

Donald Floyd, author of *Forest Sustainability: The History, the Challenge, the Promise*, writes that “trying to define sustainability and sustainable forestry is like trying to define ‘justice’ or ‘democracy.’”¹ Sustainable forestry, according to the U.S. Forest Service, “is an evolving concept.” The *Dictionary of Forestry* defines sustainability as “the capacity of forests, ranging from stands to ecoregions, to maintain their health, productivity, diversity, and overall integrity, in the long run, in the context of human activity and use.” Where have we heard this before?²

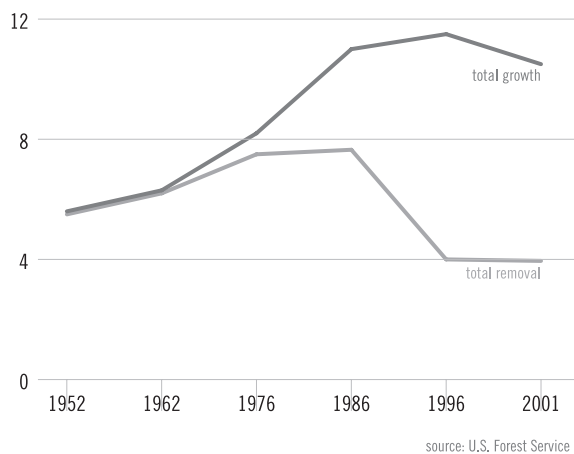
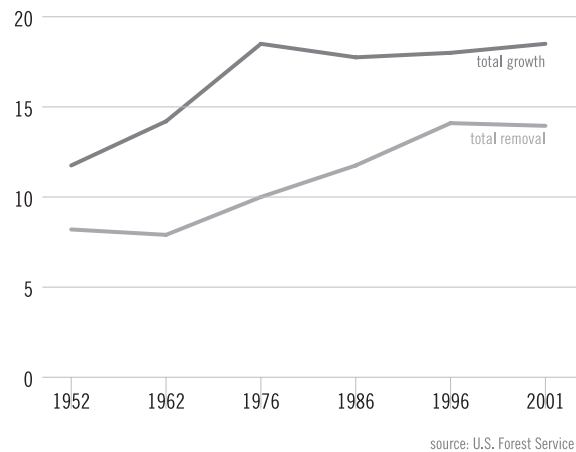
FOREST AREA HAS BEEN STABLE FOR NEARLY A CENTURY, RISING SLIGHTLY OVER THE LAST DECADE.

FIGURE ONE: FOREST GROWTH AND REMOVAL, 1952–2001



The U.S. Forest Service has recently produced a vital source of comprehensive new data and analysis of America's forestlands, the *National Report on Sustainable Forests*, that enables us to extend our knowledge and judgment on the subject.³ The report, currently in draft form, aims to develop 67 indicators of forest conditions and trends. Complete data are not yet available for all 67 indicators, and for many indicators there are only one or two data points, making it impossible to discern trends at this time. Like the Heinz Center report on U.S. ecosystems, the sustainable forestry report has not received much press coverage because of the complexity of the issues and the number of variables the report comprises.

The *National Report on Sustainable Forestry* notes the need for authoritative data on forest conditions: “Surveys have also indicated that Americans often have misperceptions about the current status and trends for forests in the U.S. For example, many think our forests are declining in extent, while in reality the total area of forests nationally has been fairly stable since about 1920 and actually increased slightly between 1990 and 2002. Also, many think we are harvesting more trees than we are growing, while in reality net growth in U.S. forests exceeds removals by a large margin.”

FIGURE TWO: GROWTH AND REMOVAL IN WESTERN TIMBERLANDS**FIGURE THREE: GROWTH AND REMOVAL IN EASTERN TIMBERLANDS**

One reason forests have increased, especially in the eastern half of the nation, is ironically rooted in a cause often lamented—the decline of farmland. Much of the northeastern farmland that was cleared from forests 200 years ago has been abandoned and is reverting back to forest. According to the Forest Service, by 2001 about two million acres a year were being planted with trees, which is an area larger than the amount of land urbanized each year through urban sprawl. The Heinz Center's report on U.S. ecosystems notes that, in eastern forests, 65 percent of timberlands are less than 60 years old, and 90 percent are less than 100 years old. This suggests that future generations can look forward to a large amount of “old growth” forests in that region.

The *National Report* includes the same measure this report has used previously—the volume of tree growth versus timber harvest—to rebut this common misperception. The trend is illustrated in Figure 1. The *National Report* comments: “If net growth on timberland compared with removals is acceptable as a measure of sustainable removal of wood products then removals of wood products in the U.S. are currently sustainable.”

The *National Report* offers a breakdown between western timberland, much of which is in publicly

owned forests, and eastern forests, which are mostly privately-owned and where the harvesting of American timber products has shifted dramatically during the last 20 years as increasing environmental restrictions have reduced Western timber harvests. These trends are displayed in Figures 2 and 3.

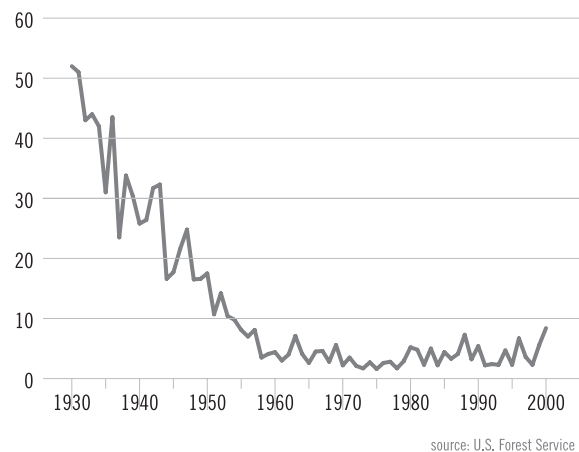
FOREST FIRES

The issue of forests became more salient in 2002 with the occurrence of a severe fire season in the western states, and the proposal of the Bush administration, through its Healthy Forests Initiative, to combat fire and disease in western forests with more active human management. Our century-long history of forest fire suppression has now come full circle.

In the early decades of the 20th century, it was not unusual to experience forest fires that burned 30 million acres or more a year—roughly equal to the size of every city and suburb in the nation combined at the time. In 1930, a staggering 52 million acres burned—an area half the size of California. (The majority of the

IN 1930, A STAGGERING 52 MILLION ACRES BURNED—AN AREA HALF THE SIZE OF CALIFORNIA.

FIGURE FOUR: MILLIONS OF ACRES BURNED IN WILDFIRES, 1930–2000

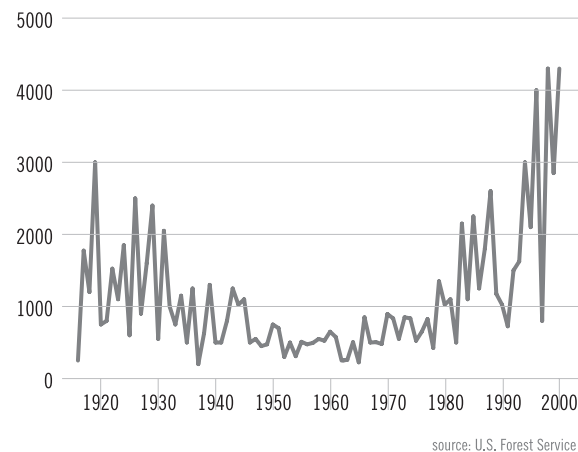


forest area burned in these fires was in the south—not the arid west as might be supposed.) More aggressive fire suppression following that catastrophic year brought the average annual burned area to about four million acres a year by the early 1960s. Figure 4 displays this trend.

As is now widely acknowledged, fire suppression without active forest management has led to overgrowth in many forests, setting up conditions for unnaturally catastrophic fires. In recent years the area burned by fires in the western states has increased substantially; by August of 2002, nearly six million acres had burned—more than in the entire decade of the 1960s.

Figure 5 displays forest area burned in wildfires in 11 western states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming). The Forest Service estimates that as much as 190 million acres of public land are at increased risk of catastrophic fire because of over-

FIGURE FIVE: FOREST AREA BURNED IN WESTERN WILDFIRES (1000 ACRES)

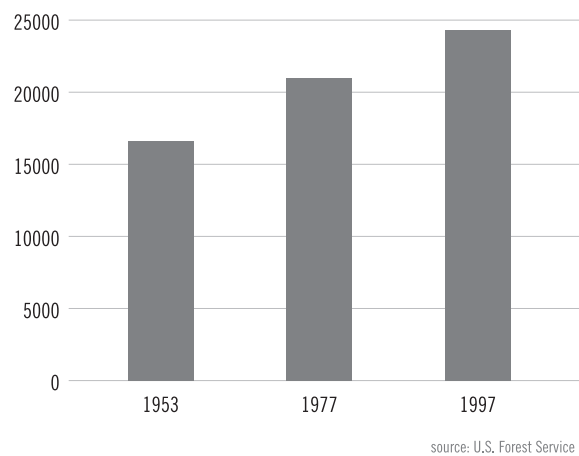


grown conditions. There is no breakdown of the fire data between public forestland—the majority of Western forestlands are public—and private forestland, where more aggressive thinning and management practices can proceed without legal and bureaucratic interference. Fires that begin on overgrown public areas often spread to private land.

Scientific American noted in a November 2002 article that “Since the early 1960s fires have become consistently hotter and bigger.”⁴ This is chiefly because fires in overgrown forests tend to be crown fires that hop from treetop to treetop, easily jumping over firebreaks and even large rivers. The Rodeo fire in Arizona in 2002 spread in one day from 800 acres to 46,000 acres; the Hayman fire in Colorado was five times larger than any previous fire in the state’s history; and Oregon’s 471,000-acre Biscuit fire was the largest in that state’s history.

Crown fires, once rare, are now the prevalent type of fire in the West, and they can utterly devastate Ponderosa pine, the predominant type of Western forest. *Scientific American* relates that “a 1977 crown fire near Mount Elden [Arizona] burned so hot that the thin volcanic soil was sterilized, and even now few Ponderosa pines have reemerged.” And the *National Report on Sustainable Forestry* adds that “The fires of

THE FOREST SERVICE ESTIMATES THAT AS MUCH AS 190 MILLION ACRES OF PUBLIC LAND ARE AT INCREASED RISK OF CATASTROPHIC FIRE BECAUSE OF OVERGROWN CONDITIONS.

FIGURE SIX: CARBON STORAGE IN U.S. FORESTLANDS**FIGURE SEVEN: ANNUAL NET CARBON STORAGE IN U.S. FORESTLANDS**

2000 have also created large areas where conditions are favorable for a buildup of bark beetle populations in fire-damaged trees, especially Douglas-fir beetle and spruce beetle. These populations could move into unburned stands and cause additional tree mortality.” And needless to say, large catastrophic fires destroy habitat for numerous species, among them many on the endangered species list.

A further consideration is the amount of air pollution large summer forest fires generate, and especially how much additional carbon dioxide is released. Trees are a primary natural source of carbon storage, and as the *Nature* magazine article on wildfires discussed in the Introduction of this report points out, unabated large-scale forest fires may contribute significant amounts of CO₂ to the atmosphere. A tree cut for a commercial purpose (other than firewood) will continue to store its carbon, while a tree that burns releases most of it.⁵

The estimates in both Figures 6 and 7 are generated from computer models and sampling, and have a wide margin of uncertainty. More recent estimates suggest that the rate of net carbon storage has declined over the last decade (see Figure 7), though the Forest Service adds the caveat that the recent decline may be due to more accurate data and changes in methodologies for estimating carbon release from dead wood.

SPECIES

Extinction of forest-dwelling species has leveled off during the last 20 years, as shown in Figure 8, though data for this indicator are incomplete. Trends for many species considered to be at risk are unknown.

Data from the Breeding Bird Survey (BBS) reveal that over the last 35 years, about 26 percent of forest bird species increased in population, while 26 percent decreased; for the remaining half, there is no evidence for either increase or decrease. There is some reason to think the peak extinction rate may have passed. The Forest Service’s 2000 *RPA Assessment of Forest and Range Lands* notes that “The Nation’s forests are getting older in many parts of the country... From an ecosystem diversity perspective, this maturation will lead to increased diversity of forest structure.”⁶

A key variable in judging habitat integrity is forest fragmentation. Measurements and methodologies of forest fragmentation are uncertain at this point, but one effort promises to yield useful information within the next few years. The Heinz Center report on ecosystems developed a metric with a single data point from satellite imagery from 1992 that will enable us to begin to track changes in forest fragmentation in future years.⁷

FIGURE EIGHT: CUMULATIVE NUMBER OF FOREST SPECIES CONSIDERED TO BE EXTINCT

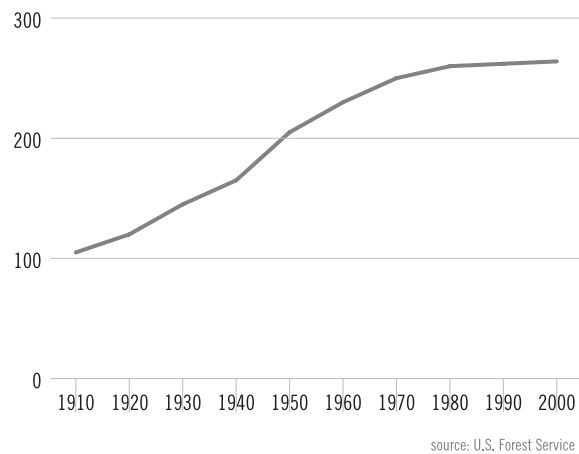
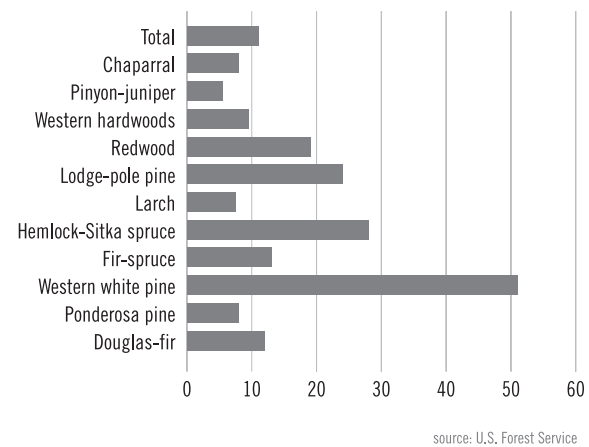


FIGURE NINE: PERCENT OF WESTERN FOREST LAND IN “RESERVE” STATUS, 1997



One data set from the *Forest Service's 2000 RPA Assessment of Forest and Range Lands* sheds light on why the politics of forest management focus so heavily on western states. Figures 9 and 10 display the percentage of western and eastern forest land held in “reserve” status. “Reserve” status denotes land held in IUCN (International Union for the Conservation of Nature) category I (strict nature reserve/wilderness area) or category II (national park). (These classifications understate the amount of land preserved, because they exclude privately-owned land, such as, for example, land the Nature Conservancy owns for preservation purposes.) Even with these limitations noted, it is striking that only three percent of eastern forestland is held in reserve status, while 11.1 percent of western forestland is held in reserve.

The IUCN has four other classifications for reserved land: national monument, habitat/species management area, protected landscape/seascape, and managed resource protection area. Figure 11 displays the comparison of the six categories between eastern and western forestlands. There is five times as much forestland held in reserve status in western forest than in eastern forests (these estimates exclude Alaska). The Forest Service notes that much of the remaining 223 million acres of western public forest

is appropriately classified in one of the remaining IUCN categories—most of it overseen by the federal Bureau of Land Management.

With classic understatement the Forest Service notes that “There will likely always be debate about how this management relates to protection and maintenance of biological diversity.” This is a polite way of saying that publicly owned forestland is always going to be a political football. This reminds us, though, that the political battle concentrates on western rather than eastern forestland because so few eastern forests are publicly owned. The political battles over forest policy have less to do with the environmental merits than the ownership status of the land.

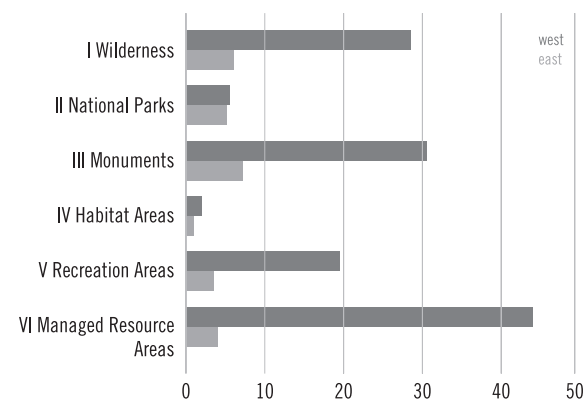
POSTSCRIPT: POLICY TRENDS

Unlike with air and water quality trends, the forest trends included here cannot be used to assess whether

IT IS STRIKING THAT ONLY THREE PERCENT OF EASTERN FORESTLAND IS HELD IN RESERVE STATUS, WHILE 11.1 PERCENT OF WESTERN FORESTLAND IS HELD IN RESERVE.

FIGURE TEN: PERCENT OF EASTERN FOREST LAND IN “RESERVE” STATUS, 1997

source: U.S. Forest Service

FIGURE ELEVEN: AMOUNT OF PROTECTED AREA IN EASTERN & WESTERN FORESTS BY IUCN CLASS

source: U.S. Forest Service

current policy is achieving its general goals. In part this is because our forest policy goals are unclear. While there is general agreement about the systemic problem of fuel loading in America's forests and the role long-term fire suppression efforts have played, there is bitter disagreement about what direction policy should now take.

One part of the Bush administration's Healthy Forests Initiative would provide incentives for private timber companies to clear excess fuel loads in national forestlands by allowing some logging at the same time. Environmentalists view this idea with suspicion, seeing it as a backdoor way of permitting logging that would not otherwise occur on public land. It is worth keeping in mind that timber sales on federal land—mostly in the west—have declined by 82 percent over the last decade. Environmental opposition has played a major role in this decline.

We will not attempt to sort out this dispute here. Rather, we would note a few additional trends that

should be kept in mind while thinking about the issue. There is one variable that is growing faster than trees in the U.S.—the federal government's fire-related budget. (Both the Forest Service and the Department of the Interior have major fire-related policy roles.) Fire budgets for the Forest Service and the Department of the Interior tripled in the 1990s, and then doubled in just one year from 2000 to 2001. (See Figure 12.)

Randal O'Toole, a long time critic of the Forest Service, points out that fire suppression has a perverse budget incentive—the worse fires get, the more the Service's budget will grow, either for further suppression efforts or for fuel load management.⁸ The Forest Service, O'Toole argues, has enjoyed what amounts to a blank check to suppress fires. Shifting budgetary incentives from fire suppression to fuel treatment will not necessarily result in better outcomes, in part because the backlog of forests in need of fuel load treatment is so enormous. As O'Toole explains,

Given the proper incentives, the Forest Service and other federal agencies will find a proper combination of mechanical treatments, prescribed fire, and commercial timber sales. But given the current incen-

THE POLITICAL BATTLES OVER FOREST POLICY HAVE LESS TO DO WITH THE ENVIRONMENTAL MERITS THAN THE OWNERSHIP STATUS OF THE LAND.

tives, the agencies cannot be trusted to do the right things because their incentives push them to do things that could actually make problems worse. The West's fire problems won't be solved by making the Forest Service dependent on fuel treatment funds any more than they were solved by making the Forest Service dependent on fire suppression funds. The ecological solution will come only from an economic solution that recognizes the perverse incentives created by Congressional appropriations to natural resource agencies such as the Forest Service.⁹

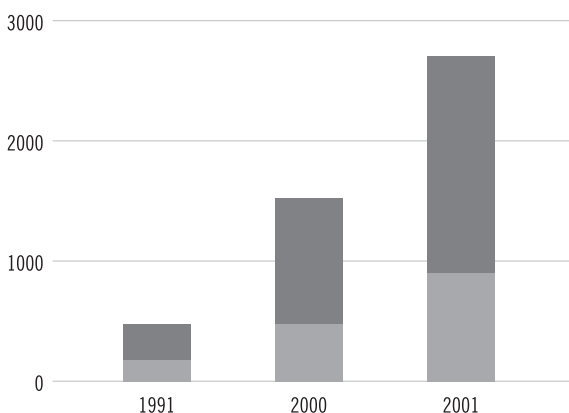
O'Toole reviews several proposals for wholesale reform of forest policy, including devolving responsibility for forest management to the states, greater use of private land trusts, and ending commercial activities in national forests. And he finds weaknesses in all of them. Among other difficulties, no single strategy is suitable for the varying kinds of forest and rangeland conditions in federally-owned land. This argues for a flexibility that is difficult to

achieve in federal policy. The likelihood is that forest disputes—and more fires—will continue for a long time to come. O'Toole laments,

In a perfect world, Environmental and commodity interests would overcome their differences and work together to get better and more efficient federal land management. In the real world, both sides believe polarization can achieve their goals better than cooperation, and fire is just too good a source of polarization for either to ignore. Members of Congress and other policymakers must learn to look beyond the polarization and misdirection to see the real problems.¹⁰

This can be said for many environmental issues, which is one reason why there is so much policy gridlock where there was once landmark legislation and policy innovation.

FIGURE TWELVE: FOREST SERVICE AND DEPT. OF INTERIOR FIRE BUDGETS (IN MILLIONS OF DOLLARS)



source: *Reforming the Fire Service*

NOTES

- 1 Durham, NC: The Forest History Society, 2002.
- 2 For a general analysis of sustainable development, see the sixth edition of this report (2000), available online at www.pacificresearch.org/pub/sab/index.html#Anchor-enviro/; see also the author's paper "Sustainable Development in the Balance," Environmental Policy Outlook #2 (Washington, D.C.: American Enterprise Institute, 2002), available online at www.aei.org/publications/pubID.14200/pub_detail.asp.
- 3 See www.srs.fs.fed.us/research/sustain/data.htm.
- 4 Douglas Gantenbein, "Burning Questions: Scientists work to understand and control the plague of wildfires in the West," *Scientific American*, November 2002, p. 84.
- 5 A dead decaying tree will also release much of its carbon to the atmosphere.
- 6 2000 RPA Assessment of Forest and Range Lands (U.S. Forest Service, March 2001), p. 25.
- 7 The forest section of the Heinz Center report can be viewed or downloaded at: www.heinzctr.org/ecosystems/forest/index.shtml.
- 8 See Randal O'Toole, *Reforming the Fire Service: An Analysis of Federal Fire Budgets and Incentives* (Bandon, OR: The Thoreau Institute, 2002).
- 9 O'Toole, p. 9.
- 10 O'Toole, p. 48.

EXAMPLE OF FUEL LOADING

The Bush administration's Healthy Forests Initiative illustrates fuel loading with the following photo series:



Bitterroot Mountains, 1891



Same Location, 1930s



And in 1990

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Steven F. Hayward is the author of PRI's annual *Index of Leading Environmental Indicators*, a major study on the state of the environment released each year on Earth Day. He is also nationally recognized for his recently released book, *The Age of Reagan: The Fall of the Old Liberal Order 1964–1980* (Prima Publishing, 2001), and *Churchill on Leadership: Executive Success in the Face of Adversity* (Prima Publishing, 1997).

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